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The Higher Ranks

IT is a curious feature of modern industrial life, in spite of its increasing complexity and of the ever-growing importance of the application of science to the manufacture of nearly everything required by civilised man, that high technical qualifications do not of themselves command the highest salaries. The facts set forth in the paper on "Administrative training for the chemical engineer," presented by Mr. E. S. Byng before the Institution of Chemical Engineers suggest that technical qualifications are not even necessary for the highest posts in industry. No doub this deduction goes beyond what the author intended, but the facts of industrial life tend to confirm this opinion. An exceedingly interesting chart was given by Mr. Byng showing the average earned incomes of grades of engineers in the U.S.A. According to this chart, all follow similar paths up to the age of 33, and thereafter diverge according to their inclinations, capabilities or fortune. Starting with an income of some $2,500 a year at 33 years of age, by the age of 45 the routine worker will have dropped to $2,000, the research engineer will have increased to $3,300, those in education to $4,500, the consulting engineer to $5,600, while those in administrative posts receive some $9,500 a year. Quite obviously, industry will pay much more to those who have administrative gifts than to those who keep the technical machine running, or who develop and put into operation new processes.

Mr. Byng may intend the lesson to be assimilated that the engineer, the chemist or the chemical engineer should endeavour to rise to the highest posts of management because his scientific and technical training fits him for those posts, but he also gives a chart showing typical ratios of "administration" to "technology" in which the duties of the managing director are assessed as 90 per cent. administration and 10 per cent. "technology or trade knowledge," while the general manager is said to require these in the proportion of 75:25.

The problem of the selection of men for administration is highly complex. Mr. Byng's point appears to be that heads of businesses can be trained by reading certain subjects, and he deprecates the prevalent notion that administrators are born and not made. Up to a point we should be disposed to agree with him, and it might be held that a technically-trained administrator is more valuable than one who is without specialised knowledge of the industry. In common with many, we have always considered that technical men should be regarded as logical candidates for seats on Boards of Directors; but not that the directorate should consist wholly, or even primarily of technicians. It has to be realised that the higher administrative posts require, above all, the capacity for leadership. It is possible to acquire knowledge of chemistry and engineering and other tools of the technicians from books or by tuition, in fact, that is the only method by which they may be acquired, and it is possible to acquire the tools of the administrator by studying such subjects as economics and business management. Over-riding all these, however, there are the purely human qualities expressed by such terms as "personality," "flair," "capacity for leadership," and so forth. These, we submit, are not to be acquired by the methods suggested by Mr. Byng, nor by the methods of training instanced by him as practised at certain centres of learning. They may be born in the individual, but they may also be acquired as the result of environment, up-bringing in youth, or experience in more mature years.

The study of the subject set forth in Mr. Byng's paper is not to be deprecated. A valuable feature of his paper is the emphasis he places upon a wider reading than is customary. The engineer or chemist who can find the time to study the economics of his industry will do much to set himself along the path that leads to management. All these things, however, are but the tools; they require the touchstone of human personality and experience. The managing director is no narrow technician; he is a man of the world, a man well versed in the ways and foibles of his fellows, with an ability to "handle" men and affairs. Technical men, and perhaps especially chemists in this country, are prone to regard the study of their subject as the most important part of their training; if they aspire to the higher ranks, if they desire to become more than technicians, they must give themselves also that wider training that comes of mixing with all sorts and conditions of men in the greater world around them. It is probably not without significance that Britain, which has produced so many outstanding leaders in the truest sense of the word, has been the cradle of every kind of sport that demands team-work. By such means is leadership developed.

However long we make our terms, however full our time-tables, and however great be the capacity of our students to absorb, still we shall have failed to satisfy the demand of industrialists for men of "personality"—educated to take wide views.

—Professor R. V. Southwell.

NOTES AND COMMENTS

Overseas Trade in March

CONSIDERING the shocks to business confidence last month, the trade returns for March are extraordinarily good. Exports reached the highest figure since November, and were about £3½ millions more than those of the short month of February and only £½ million below those of March, 1938. Imports were also the highest for four months, but were nearly £7 millions below the figure for the corresponding month of last year, the adverse trade balance being reduced by £5¾ millions compared with the same period. Chemical export trade made an even better showing than the general run of industry. Exports of chemicals, drugs, dyes and colours were valued at £2,106,823, an increase of £137,457 compared with March, 1938, and only £17,321 below the figure for the corresponding month in 1937. Imports at £1,387,739 were £218,438 higher than in March, 1938. Taken for all in all, last month's overseas trade returns denote a position of which industry can be justifiably proud and are a tribute to the firm resolve of the industrialist to meet political repercussions on his trade with a steady and determined front.

Confidence in the Economic Future

LORD McGOWAN is one of those who refuse to take a pessimistic view. Speaking at Glasgow on Monday, he said that I.C.I. were spending a large sum on industrial developments which implied confidence in the economic future and that if others followed their example, there would be good reason to count on a revival of normal prosperity in trade and industry quite apart from the work that was being demanded by the menace of the present international situation. Lord McGowan stated that he believed it would be possible to overcome the present international difficulties, which he regarded as transitory. Certainly, he added, the danger of an emergency arising would recede with every day that passed. He emphasised, however, the necessity for a realisation that we could not hope for that simply by muddling through as a nation, and that we must make a concentrated effort to strengthen the country's defences.

The Growth of India's Chemical Industry

THE position of chemical industry in the Indian economy is an interesting one. The last few years have witnessed a great industrial expansion spreading through the most diverse manufacturing enterprises which go to make up the country's productive capacity. And in the new industries which have been created and in the growth of existing concerns chemicals have been in increasing demand as basic materials of production. Figures given by Dr. J. Matthai, in an article in the Indian Section of this month's *Times Trade and Engineering* show that while imports into India of products such as paints and colours, soap and matches, are being largely displaced by local production, imports of chemicals in the year 1937-38 were almost half as much again as the imports in 1929-30. This is due to the fact that India is still mainly dependent on other countries for chemicals and draws attention to a gap in India's industrial equipment. Dr. Matthai states that the manufacture in India of chemicals devised from sulphuric acid which has been carried on for many years, grew up under the shelter of the high freight rates on imported acids. But this assistance was not present in the case of salts, so that this side of the industry has remained comparatively undeveloped. The present total production of India's heavy chemical (and manufactured fertiliser) industry is estimated at about 30,000 tons in terms of sulphuric acid. This is roughly a third of the country's total consumption and of chemicals and fertilisers based on sulphuric acid. Up to the present alkalies have not been manufactured in India, but the two projects recently announced, the manufacture of soda ash, caustic soda and chlorine by a subsidiary company of Imperial Chemical Industries, and of soda ash, caustic soda and other heavy chemicals by Tatas, are extremely important developments. This must result in a falling off in volume of chemical imports into India, but Dr. Matthai is of the opinion that the further development of Indian industries will be difficult unless consumption increases and that the position calls for a policy of strengthening the general economic resources of the country rather than a mere restriction of imports.

Safety in Chemical Works

RECENT annual reports of H.M. Chief Inspector of Factories have shown that the number of accidents occurring in all classes of industry has slowly increased. This increase is no doubt due to growth in industrial activities, but while it is true that the number of accidents which *can* occur depends directly on the volume of manufacture, it does not follow the number of accidents which do occur bears the same relationship. So far as the chemical industry is concerned this is certainly the case. From the earliest days of the industry, employers and employees alike have had a lively sense of the nature of the products with which they were dealing and of the disastrous effects which could arise from accidents with certain materials. While this has had the effect of keeping the accident rate at a low level, statistics show that the rate has grown during recent years in common with most other branches of industry. The new Factories Act put into force last year, not only made major amendments to the old law and introduced entirely new provisions, but it inevitably stimulated safety-mindedness in industry.

A Safety Conference

A CONFERENCE on safety in chemical works was held on Thursday and Friday of this week by the Chemical Engineering Group. An opening address was given by Sir Duncan Wilson, H.M. Chief Inspector of Factories, and nine papers were read relating to such subjects as the function of works management in safety, modern fire fighting, toxicity of organic solvents, testing of toxic gases, gassing accidents, respirators and protective clothing and equipment. It is impossible to summarise the papers here, but they have been published in *Chemistry and Industry*. One aspect of the subject, which was considered in more than one of the papers, might, however, be commented upon. This is education of the workers in the properties of the materials which they have to handle. Clearly the knowledge of the direction in which dangers might be expected to arise is a fundamental to the prevention of accidents. Yet there are many cases in industry in which dangers are not fully appreciated. To quote but two examples given at the conference: the danger of exposure to low concentrations of organic solvents and the extreme toxicity of hydrogen sulphide, which is almost equal to that of hydrogen cyanide.

Administrative Training for the Chemical Engineer*

By
E. S. BYNG, M.I.E.E., F.I.I.A.

THE outstanding feature of modern industry is its increasing complexity. On the one hand advances in science and technology are continually leading to the demand for improvements in methods of production and for the development of new types of product. On the other hand, the economic side, and especially that of successful marketing, is becoming more involved and formidable in view of intensive competition at home and the difficulties of international trade.

These conditions have led the industrialist to rely more and more upon the services of professional experts who have specialised in the various components of his enterprise—accountants, production managers, sales managers, engineers, chemists, and so on. Each of these specialists has a definite function to perform, and his concentration upon that function involves a fresh complexity by tending to make him self-centred, working in a water-tight compartment and regarding all the other functions as subservient to his own. Thus arises the necessity for co-ordinating and integrating the work of the experts so that the organisation as a whole may efficiently fulfil its purpose of rendering service to the community on a sound profitable basis.

The technical expert is, therefore, subject both in principle and in practice to the administrator who frames the policy of the enterprise and directs the operations which translate that policy into action. However eminent a technician may be, the decision as to how far and in which direction his recommendations are to be put into practice rests with the man who correlates them with those of other technicians and weighs them up in relation to financial, commercial and political conditions.

For this reason it frequently happens that industries of a highly technical character are under the control of men who are not technologists. They have been selected for their ability and experience as administrators.

Definition of Administration

The suggestion that chemical engineers should turn their thoughts to administrative problems may seem to imply the cultivation of a field quite foreign to their daily work. Administration has been broadly defined as the function of co-ordinating the specialist activities necessary to the efficient operation of an industrial or other undertaking; but in common with most broad definitions this is subject to qualifications. Administrative duties merge into managerial and departmental duties and are not confined to the high control of an organisation; they are exercised in varying degrees by every member of the staff who is charged with responsibility.

Many chemical engineers, in fact, may be applying an innate capacity for administration without being aware of it. They handle administrative matters as these turn up in a day's work, dealing with them on empirical "common-sense" lines. The less conscious they are of being out of their depth in meeting these problems, the more likely is it that they possess managerial ability worth cultivating.

In the case of a chemical engineer, many functions may have to be performed apart from the direct application of technical knowledge to the design and operation of plant.

He may have, for example:—

(1) To select and control his staff.
(2) To determine the economic means of meeting specified requirements.
(3) To define the standards to be adopted in the product.
(4) To keep engineering costs down to the lowest level consistent with the maintenance of the standards.
(5) To plan for future requirements.
(6) To collaborate with the production, sales and finance departments in framing and carrying out manufacturing programmes.
(7) To advise on such matters as guarantees to customers and the handling of complaints.

Where the engineer acts as a works manager the administrative element of his duties is enlarged. He has not only to take a greater share of responsibility in planning the manufacturing programme and in personnel management, but he has to control wage policies, storekeeping, inspection, transport, costing, and the maintenance of buildings and plant.

Characteristics of Modern Administration

The chemical engineer who is attracted by the wider prospects of administrative activities need not be disheartened by a sense of his imperfections in certain directions. The point upon which he should concentrate is undoubtedly "a sound knowledge of the technique of industrial administration." Without that, all the other virtues will be of little effective use.

The main characteristics of modern industrial administration may be expressed in general terms under three headings:—

(1) Functional division and delegation of responsibility and authority, involving specialisation and simplification.
(2) Co-ordination and integration of activities, involving the encouragement of the team spirit.
(3) The substitution of fact analysis for guesswork, involving planning, costing, and budgetary control.

Running parallel with all the problems of planning, finance, market research, sales development and so on is the problem of personnel. From a certain angle, indeed, the art of administration appears to lie mainly in the right selection of men, since if the individual members of the staff possess the capabilities and temperament suited to their work they may be expected to achieve a large measure of harmony and efficiency. Every executive who has been charged with the duty of recruiting assistants, foremen and process workers knows how difficult it is to select men with any measure of confidence in the ultimate result. In the solution of this and kindred problems of personnel, science has come to the aid of the administrator. Industrial psychology is a comparatively new science, but it has developed a useful technique by which applicants for any particular type of work can be graded according to the degree in which they possess the mental and physical aptitudes and also the temperamental qualities which make for efficiency and stability in the occupation concerned. The technique is admittedly far from being infallible, since the human element presents too many variables for the attainment of precise results; nevertheless the psychological tests, taken in conjunction with the candidate's record, do minimise the uncertainties of selection.

The Value of Industrial Psychology

Personnel selection is, however, only one of the directions in which industrial psychology aids the administrator. It assists in the layout of plant and the study of working conditions and methods so that operations may be carried on with the minimum of fatigue, strain, and danger. It affords an effective means of discovering and dealing with the causes of staff friction, interdepartmental jealousies, and difficulties of supervision.

This aspect of administration—the efficient handling of men—has been described as the most recent of industrial problems. Actually it is the oldest, since it had to be tackled by the first man who employed others. What is new about it is simply the change, within the last ten or twenty years, from empirical to scientific treatment.

* From a paper presented at a meeting of the Institution of Chemical Engineers held at Burlington House, London, on Tuesday.

Study, of course, is not everything in the case of administration any more than it is in law, medicine, chemical engineering, or anything else. It does, however, provide the material which the student must use according to his ability and application. The engineer who has to perform administrative duties, or hopes for promotion to an executive position, will therefore strengthen his hand by acquiring knowledge of the subject and by consciously cultivating the qualities enabling him to make effective use of his knowledge.

The study of administration is of importance in all branches of engineering, but it has a special value for the chemical engineer. He is generally concerned with the manufacture of chemical products from raw materials on the large scale, and therefore finds himself involved in many questions of administration which lie outside the range of engineers whose responsibilities are confined to design and construction.

Tackling Business Problems Scientifically

By the nature of his functions, therefore, the chemical engineer is induced to pass beyond the purely technical problems of the process under his charge and to consider questions of manufacturing supervision, labour management, statistical records, sales methods and other phases of business. In addition, he has a variety of other matters to handle pertaining in particular to chemical processes, such as :—

(1) The protection of chemical processes and products by patents.
(2) Questions of patent opposition and infringement.
(3) The character and amount of insurance to be effected on his plant, stocks of raw material, and work-in-progress.
(4) Labour laws and plant regulations with special reference to workmen's compensation, hygiene, etc.
(5) The framing of contracts for the purchase of chemical machinery and supplies.
(6) Regulations concerning effluents.

The technical training which the chemical engineer receives does not generally cover commercial, legal, and managerial problems of this kind. Indirectly, however, it affords a means of tackling them in the right spirit, since it inculcates the scientific method.

The education of the chemical engineer to fulfil his proper functions in modern industry is a very complex and controversial question. Professor R. V. Southwell, in his presidential address to Section G of the British Association last year, said that, where the purpose is to train men for industry, " the taking of honours in a final examination should indicate an assimilation of engineering principles adequate in a man who is starting an industrial career—but not more than this." He added that industrialists should be asked to scrutinise university syllabuses and say from their experience what subjects should be omitted as never likely to be applied in practice, or as being easily and more appropriately learned in the works.

Duration of Chemical Engineering Course

It would probably be difficult to suggest any suitable deletions from the syllabus drawn up by the Institution of Chemical Engineers. At the time this syllabus was prepared chemical engineering was, with few exceptions, taught in this country as a one-year post-graduate course of study, superimposed upon a three-year undergraduate course in either chemistry or engineering. It appears to be a matter of general agreement that the duration of the undergraduate course should not be less than four years, and it is understood that the new syllabus which is being drawn up by the Institution will adopt this period as a basis. In the meantime, the existing syllabus recommends a university or technical college course covering chemistry, physics, and engineering, occupying three years and followed by a year spent in studying subjects specially within the province of the chemical engineer—chemical engineering processes, chemical plant construction, factory design and construction, and industrial economics. This curriculum may be regarded as the minimum standard of necessary training and more susceptible to addition than to subtraction. Under the heading of " industrial economics " some approach is made to the administrative problems with which the chemical engineer will have to deal; but it is at best a very modest approach as it deals only with a few out of the many general principles of factory organisation and management under the headings of factory records, including costing and flow sheets; preparation of specifications, designs and estimates; preparation of reports; and the compilation and indexing of technical information.

American Systems of Training

Before discussing how the syllabus may be usefully improved it will be interesting to glance at systems of training for chemical engineers in the United States. There, also, it is widely felt that a chemical engineer cannot be properly trained in less than four years, and that an additional year of study will give him a great advantage. In four years the chemical engineer can qualify for the Bachelor degree, in five as a Master, and with two additional years as a Doctor.

Although chemistry is a very wide subject, and chemical engineering a very exacting pursuit, it will be admitted that such extended periods of training give the budding chemical engineer the opportunity of pursuing his studies in any desired direction.

In the University of Michigan all the chemical and other engineering students spend one year of their course for the Bachelor's degree on economic subjects, and any students particularly interested in the industrial side are encouraged to include economics among their optional subjects during another year. They are thus given a useful foundation for continuing the study of economics and business management in order to obtain a Master's degree at the end of the fifth year.

Further facilities are available for this study after the graduates leave the university and obtain employment. Their working week, which is rarely over 44 hours and may be as low as 40, gives them an ample margin of leisure for evening and week-end study, which is encouraged not only by University extension courses and evening classes organised by schools and colleges, but also by the Engineers' Council for Professional Development, which promotes sponsored reading. As most of the graduates do not occupy executive posts or engage in administrative work during the first years of employment, these facilities enable them to round off the knowledge they obtained during their University courses and supplement it in any direction likely to be useful in administrative duties.

Value of Post-Graduate Studies in the Technical Field

It appears that American universities have contrived, by various methods, to give chemical engineers some measure of systematic instruction on the administrative side. As the general conditions governing chemical engineering in relation to education and industry are alike in both countries, there seems to be no insuperable obstacle to a similar extension of the educational system here.

The most direct way of dealing with the problem would be to expand the present section of " industrial economics " in the existing curriculum beyond its very restricted range, involving either an increase in the period of education or the pruning of the curriculum in other directions. Either course may be considered impossible, but it may be argued that education for chemical engineering is a comparatively new growth and should still be regarded as subject to amendment and improvement.

It appears, however, that the most feasible plan would be to develop post-graduate studies, either in evening classes or by organised reading. The value of such studies is already recognised in the technical field, and chemical engineers may be induced to take a leaf out of the book of the medical profession and organise " refresher courses " for practitioners of many years' standing.

The various methods of supplementing the standard course

of technical education with instruction on industrial administration may be summarised as follows:—

(1) Course consisting of one hour's lecture per week during the final year at college.

(2) Post-graduate course for one year immediately following the engineering course.

(3) Post-graduate course for one year after two or three years of business experience.

(4) Part-time evening classes taken concurrently with experience in the works.

(5) Private courses in reading.

(6) Correspondence classes.

Many of the large educational centres now provide courses of instruction in industrial and business administration. In some cases the course is of a post-graduate character.

The full development of facilities for education in industrial administration clearly depends upon co-operation between educationists and bodies like the Institute of Industrial Administration, in conjunction with employers themselves. Many of the more progressive employers already recognise the necessity for adjusting the working conditions of their trainees so that advanced technical education may accompany practical work.

When the subject of administration is given its proper place in the scheme of engineering education, employers will appreciate the importance of extending similar facilities to trainees and to other members of their staffs who display aptitude for executive and managerial functions. The examinations of the Institute of Industrial Administration may be fitly mentioned, for although the Institute is not a teaching body, but a professional one examining and qualifying in management, its examinations—which by the way are open to all, whether members or non-members, who desire thus to increase their administrative qualifications—indicate the range and standard to which educational bodies specialising in courses of instruction in administration should attain.

Discussion

The Handmaidens of Administration—Problems of Training Future Leaders in Industry

DR. E. W. SMITH, C.B.E., after congratulating Mr. Byng on the excellence of his paper, remarked that in this country we had a reputation for being administrators and leaders; but that was at a time when other countries had fewer opportunities and when we were prepared to take the lead in any thing and at any time and take any risks. Because we were prepared to assume leadership we got away with it, but today there was proof without doubt that the man of primary importance in industry was the man who was trained in administration. The chemist and engineer, the physicist and electrician, the plumber and bricklayer, as such, were confined purely to those trades and were the handmaidens of administration. The essential of administration was good, detailed work, but it was just as essential to have someone who could co-ordinate and collaborate all those individuals and details in order to get the best out of experts. His experience was that the chemist, as such, made a poor administrator. He thought that the reason was that the chemist had to be exact and was responsible for detail in a way which was quite different from that of a salesman or an administrator. The average business man, however, had to cut corners and use his judgment; he had to take chances, and those chances, nine times out of ten, had to be right. It was the experience of those handmaidens, however, which enabled the administrator to cut the corners.

Dr. Smith went on to maintain that there should be a systematic preliminary course available for all university students and even secondary schoolboys in order to give them a perspective of administration; he thought also that it would be a good thing for teachers of higher schools and university professors if they themselves could have an experience which would enable them to give the proper perspective to the men under them as to the relationship between their subject and application of that subject in after life. Dr. Smith concluded by saying that the selection of a successful administrator depended not so much in advertising for a first class man but in choosing a boy of 18 or 19 with an eye to the way in which his characteristics might develop 20 or 30 years later. He suggested also that if everyone in an organisation provided opportunities involving responsibility for those under them, encouraged them in their successes, and bore the blame for their failures, they would have a staff worth while.

DR. W. H. COATES suggested that the attention of the younger technical expert could be best directed to the importance of administration on broad lines such as an appreciation of the fundamental principles of economics, including supply and demand, the laws of substitution, principle of diminishing utility and the broad elements of monetary theory, an acquaintance of the human factor such as the reaction of an individual to the action of an administrator or other members of the organisation, an understanding of events in the world and general world atmosphere and an appreciation of the movements of the organisation in which he was employed and its hopes and prospects. He should also have the ability to use the expert to the best advantage.

MR. L. V. COCKS stressed that the general training of a chemical engineer must be considered in relation to administrative training, and in that connection he suggested that it was impossible for a student to study completely two subjects such as chemistry and engineering during the period of from four to five years necessary to reach honours standard in one subject. An alternative was to have two courses involving from six to eight years study, but the difficulty there was that a man who had spent so long at a university had a tendency to become "university minded" and to find the rigours of industry exceptionally great. He thought that the best thing was what the Institution of Chemical Engineers had done. They had virtually said that the best thing was to have a full training in one of the sciences, and then at some later period, not necessarily immediately, a further course should be taken covering all these other points, such as industrial economics and the whole series of items of administration. An excellent man might not want to delve too deeply into the side of administration, but they all agreed that he should be given an opportunity of looking into that side. It was largely up to the man himself as to what extent he was going to follow the administrative side. He might be in a small concern, but by studying courses in the evening and by correspondence, having a full qualification in one subject, whether chemistry or engineering, and appreciating complementary subjects, he would be able to understand the value of his own chemical and engineering experts as he passed to the administrative side. Mr. Cocks stressed the importance of employers giving every encouragement to those of their employees who showed a bent for administration, and he stated that his own firm, Lever Bros., Port Sunlight, Ltd., gave every facility to those who showed promise.

MR. R. H. STEIN suggested that the administrative training for a young man should be designed to make him appreciate the difficulties of administration so that he would co-operate with the administrator in his factory. It was to give that broadening of the mind that seemed to him to be the essential point of such training.

MR. R. B. PILCHER (registrar and secretary of the Institute of Chemistry) said that he felt that there were people in this country who learned their business as they went along and learned it a great deal more by their actual experience than by theory. He did not suggest that these things should not be set down on paper and looked at, but he wanted them to remember that we were a nation who would always have men who, once they assimilated some fundamental training, were capable managers. He had been among chemists for a very

long time, and he thought that in a register of something like 7,200 members he could count easily five per cent. who were holding positions as directors or managers, and others in posts of real responsibility. If you could say that five per cent. of a profession were holding such positions he did not think that it was too bad.

MR. H. W. CREMER advocated the placing of industrial economics on the syllabus of the Institution. The difficulty was to decide what to leave out to make room for this course. He hoped, however, that by intelligent selection they could reduce redundant matter and find a place for matters such as referred to by Mr. Byng.

DR. A. J. KIERAN said that Mr. Byng had pointed out that it was a serious indictment of the present situation that when industrial concerns appointed men to administrative posts really good technicians were often left out of consideration. He felt that the remedy lay firstly in the hands of the universities and secondly in industry itself. So far as the former were concerned, he thought they were doing their job admirably, but he did not feel that it would be a good plan to impose on the student a whole host of points in connection with finance and general industrial administration. At the outset a student should have a very firm foundation of technical knowledge, combined with a keen appreciation of costs. Beyond that he did not think that the universities could go much further. Administrative ability could best be stimulated and practised in industry itself, and he felt that the latter could do a great deal towards training the student who came well equipped from the university.

PROFESSOR H. E. WATSON observed that the chemical engineer had been described to him as a superman. If they were going to graft on to his training a knowledge of administration, a description would be beyond words. A chemical engineer who also had an intensive course of administration was going to be the "big man," but it was obvious that there were not many chemical engineers who were capable of doing such a thing. Therefore he did not think that it should be obligatory on all chemical engineers to study administration in the way that had been suggested that evening. He thought, however, that it was essential that every chemical engineer should study the aspect of cost, but it was doubtful to him whether it was necessary for a deeper study of administration. He agreed with Dr. Kieran that university training should be confined to fundamentals; firstly, all the fundamentals of chemical engineering, including the question of cost, and, secondly, some slight additional training regarding other questions, such as administration, patents, etc. He thought that a student could be taught the principles of administration better by experience in industry than by the more theoretical methods employed by universities.

MR. H. V. POTTER said that he had always been in favour of the American idea whereby a young graduate, during the period of graduation, took a job in some industrial organisation. He believed that it was necessary to his technical and scientific career to have a knowledge of industrial workings during his period of study. It would enable him to bring more judgment of business matters into his studies, and it was better for him to have that knowledge at an early stage of his career than leave its acquisition until later.

DR. A. J. V. UNDERWOOD said that it was interesting to note that in the U.S.A. the engineer was occupying a high percentage of administrative posts, but in this country a training in Greek and Latin, or the ability to be one of eight men to row a boat faster than another eight men, was apparently considered a much better qualification than a training in engineering. He felt that some day consideration would have to be given to the adoption of the "sandwich" method whereby a student spent six months in the university and six months in industry.

MR. H. MACFARLAND DAVIS expressed the opinion that a student should not be burdened with too much administrative knowledge during his preliminary studies. He should have an introduction, then, after he had acquired a profession and practised it, he should study administration fairly extensively if he felt so inclined.

In a brief reply to the discussion, MR. BYNG said that he thought that every student, before going into industry, should be given a peep into the questions of administration. He suggested that teachers were not taught how to teach from that wider point of view, and he did not think that there was anything exceptional in the suggestion that industrialists should have a "refresher" course from time to time. There was no reason why they could not dovetail into syllabuses the elementary principles of administration. Mr. Byng was thanked for his paper by the president, MR. F. H. ROGERS.

New British Standard Specifications

Benzoles, Coal Tar Naphthas, Toluoles and Xyloles

THE British Standards Institution has just issued four specifications dealing respectively with benzoles, coal tar naphthas, toluoles and xyloles. These specifications are based on the standard specifications of the National Benzole Association, and the methods of testing and the description of the apparatus contained in the appendices are those which have been recommended by the Standardisation of Tar Products Tests Committee.

Benzoles.—The specification for benzoles covers pure benzole, pure benzole for nitration, motor benzole, 90's benzole and industrial benzole. Although motor benzole is suitable for certain industrial purposes it was felt that there was still a need for a specification for an acid-wash benzole of wide distillation range and the specification for industrial benzole was therefore prepared to cover this need.

Coal tar naphthas.—The coal tar naphtha specification covers coal tar solvent naphthas 96/160, 90/160, 90/190, 90/190 unrectified and 90/200 unrectified.

Xyloles.—The xylole specification covers 2°, 3° and 5° xylole.

Toluoles.—The toluole specification covers pure toluole, pure toluole for nitration, 90's and 95's toluole.

Copies of these British Standard Specifications (Nos. 135, 458, 479 and 805) may be obtained from the British Standards Institution, 28 Victoria Street, S.W.1 (3s. 6d. each or 3s. 8d. each post free).

Stabilisation of the Indian Lac Industry

Joint Committee Representative of Interested Parties

LEGISLATIVE measures for the stabilisation of the lac industry in the province of Bihar are likely to be introduced shortly as a result of the deliberations of the Joint Lac Committee for Bihar, the United Provinces, the Central Provinces and Bengal, which met recently. Rehabilitation of the lac industry—all aspects of production and marketing of lac and lac products—is engaging the attention of the Committee, which represents in its personnel all the interested provinces, manufacturers, shippers and growers. The Committee has been devoting its time to considering ways and means of organising the small manufacturers and discussing various suggestions for improving the price of shellac. Among other items the Committee is expected to discuss the important question of finding new uses for shellac within the country. It also aims at improving manufacture of shellac and seed lac by laying down tentative grades and grade specifications.

WITH the discovery that shark oil possesses an extraordinarily high vitamin content and in view of the public demand for a cheap substitute for imported cod liver oil for therapeutic use, the Department of Fisheries of the Government of Madras is considering the question of organising and developing the manufacture of shark liver oil as an industry in the province.

Fire Fighting in Chemical Industries

A Wide Range of Foam and CO_2 Appliances

WHILE every industrial organisation has to provide adequate fire fighting equipment to deal with the more generally known fire dangers, the use of chemicals often establishes fire risks of a particularly serious nature. While water is generally accepted as one of the most efficient fire fighting mediums it is not only useless when used against highly inflammable materials, but it has a tendency to spread the area of the fire to dangerous proportions. The Pyrene Co., Ltd., have spent many years in perfecting specialised forms of protection to cover the more dangerous fire risks and the outcome of this work is seen in a wide range of foam and CO_2 fire appliances and installations designed to meet all conditions.

"Phomene" foam fire extinguishers employ foam constituted of minute bubbles inflated with carbon dioxide. This foam is produced from two distinct solutions stored in separate containers. Upon the mixture of these solutions chemical reaction takes place which provides the necessary pressure for the expulsion of the foam in the form of a powerful jet. The foam spreads over the surface of liquids or substances and completely blankets the flames. These extinguishers are made in capacities of 1 and 2 gallons, while there are chemically operated foam engines of 10 and 34 gallons capacity, Phomene foam generators and complete Phomene foam installations.

The F.B.2 model Pyrene foam-making branchpipe. It is designed to project either a foam or water jet at will.

The Pyrene foam-making branchpipe is a comparatively recent innovation which generates a highly efficient mechanical foam from Pyrene foam compound. Water is converted into foam within the branchpipe itself, the correct proportions of foam compound and air being drawn into the water stream and delivered in the form of a dense foam jet at the rate of 450 gallons per minute. Pyrene foam-making branchpipes are, however, made in a range of sizes producing up to 2,000 gallons of foam per minute. The foam produced possesses remarkable stability and it is capable of dealing effectively with oils, spirits, alcohols and solvents.

The company is responsible for the installation of large capacity CO_2 fire protection units in many industrial undertakings. These installations are designed to suit specific fire

(*Continued at foot of next column.*)

risks and comprise a requisite quantity of CO_2 gas cylinders which are connected to a common manifold and distribution system terminating in suitably placed CO_2 gas discharge heads. These installations may be operated either manually or automatically and in the latter case a system of automatic fire detectors and releases is embodied in the installation. These CO_2 installations provide instant application of the gas to all fire danger points. The equipment is particularly suitable for interior fire risks involving oils, spirits, alcohols, solvents and highly inflammable substances. For smaller fire risks of this kind there is a comprehensive range of Pyrene CO_2 hand fire extinguishers made in sizes of 2/4/7 and 12 lb. capacity. There are also light portable units fitted to two wheeled trailer chassis in 20, 60 and 100 lb. capacity.

Other Pyrene fire appliances include the well-known extinguisher, Conquest soda-acid extinguishers, hose and hydrant installations and the Pyrene Everyway hose reel for dealing with large and small fires involving freely burning materials.

Factories Act, 1937

Concessions Secured for Manholes in Plant Constructed before the Passing of the Act

SECTION 27 of the Factories Act, 1937, lays down certain minimum sizes for manholes in fixed and mobile plant. As the result of an application by the Association of British Chemical Manufacturers, certain concessions have been secured for manholes in plant constructed before the passing of the Act. Factory Forms, Nos. 665 and 666, will be used to grant the exemptions in question. Form No. 665 relates to fixed plant and shows that exemptions will be made subject to the following conditions:—

(1) that in the case of (a) rectangular or oval manholes the sum of the length and the width shall not be less than twenty-eight inches and that neither of these dimensions is less than twelve inches; (b) circular manholes the diameter is not less than fourteen inches;

(2) that an adequate supply of fresh air is maintained to the interior of any confined space in such plant at all times when any person is working therein, or that such person is wearing "breathing apparatus" as defined in the Chemical Works Regulations, 1922, or otherwise approved by the Chief Inspector of Factories.

Mobile Plant

Form No. 666 relates to mobile plant. Here exemptions will be made subject to the same conditions as those for fixed plant except that in the case of rectangular or oval manholes the sum of the length and the width shall not be less than twenty-six inches and that neither of these dimensions is less than *ten-and-a-half* inches.

Applications for exemption must be made through the local Factory Inspector, giving full details of the plant and sizes of the manholes for which exemption is being sought. This applies to fixed plant in the works and to mobile plant where it may be considered as being "attached" to the particular factory. In the case of fleets of mobile plant such as road tanks or tank wagons which are used from distribution centres which are not factories, application for the whole fleet should be made direct to the Chief Inspector of Factories, Home Office, Whitehall, London, S.W.1.

Manholes above the new minimum sizes will be exempted without special inquiry. In the case of manholes in existing plant which are still below the new minimum sizes and which cannot be enlarged for technical or structural reasons, exemption may still be possible for these, but only in very exceptional cases, and after special inquiry by the Factory Inspector. Separate schedules must therefore be submitted for manholes above and below the new minima.

(*Continued from preceding column.*)

Plant Growth in Liquid Media

FROM A SPECIAL CORRESPONDENT.

INTERESTING experiments on the possibility of growing plants commercially in liquid media have been carried out in France by Georges Truffaut. A number of different media were tried by Truffaut, with varying degrees of success. They led to the conclusion that it is necessary to know the exact composition of a plant before it is possible to develop a suitable culture medium for it. Components, other than carbon, oxygen and hydrogen, vary considerably in the quantity present. Thus, hortensia contains 7.06 parts per thousand of nitrogen, while cabbage contains only 1.92 parts per thousand; on the other hand, cabbage contains 7.303 parts per thousand of potassium, while hortensia contains only 3.352 and carrot 9.640.

Another factor which influences the composition of the culture medium is the role played by each of the elements; certain of them can safely be added in excess of the exactly required quantity, while others may not. Thus nitrogen is an essential element, a deficiency retarding the growth of leaves and preventing blossoming. On the other hand, an excess of nitrogen greatly encourages the growth of leaves, at the expense of the fruit yield. Phosphorus, however, may safely be added in excess; so may potassium and sodium, but the latter plays a much less important part in the plant economy than the former. Chlorine is necessary, but plant requirements of this element are very small. Calcium may be added in excess, and in fact should be if there is also an excess of potassium, magnesium or sodium as it seems to counteract the effects of the excess of these elements. A considerable number of other elements also enter into the composition of plants, and seem to affect their colour and the flavour of the fruit rather than to play any really important part in the growth of the plant itself. Traces of boron, however, are essential.

Taking these various factors into consideration, Truffaut developed a solution of the following composition (all quantities in milligrams per litre of aqueous solution): Diammonium phosphate 142.0, magnesium sulphate 284.0, potassium nitrate 568.0, calcium nitrate 710.0, ferric chloride 112.0, potassium iodide 2.84, boric acid 0.56, zinc sulphate 0.56, and manganese sulphate 0.56. This solution gives an alkaline reaction, and it is reduced to pH 6 by the addition of a suitable quantity of phosphoric acid. The plants grown in this solution show a rather luxuriant growth of leaves, which would seem to indicate a slight excess of nitrogen.

In growing plants in the solution, Truffaut used a wooden box, coated with paraffin wax, across which a heavy wire netting was fixed. This was covered with a 2 inch layer of straw, glass wool, etc., so that the plant roots can run through it into the liquid which fills the tank to within about half an inch or an inch of the wire netting. Changes in the composition of the solution during growth are rectified by adding fresh culture solution and adjusting the pH to 6 by means of phosphoric acid or diammonium phosphate.

Truffaut claims to have grown tomato plants in liquid medium which reached a height of 13 feet and bore as much as 15 pounds of tomatoes at a time. The fruit was equal in size and quality to that grown in soil and developed more quickly.

BRITISH DISINFECTANT MANUFACTURERS' ASSOCIATION

The following were appointed at the annual general meeting of the British Disinfectant Manufacturers' Association on April 4, to serve as the officers and executive committee for the ensuing year: Chairman, Mr. H. M. Spackman; vice-chairman, Mr. D. S. A. McDougall; honorary treasurer, Mr. R. A. Blair; honorary auditor, Mr. R. G. Berchem; executive committee, Mr. S. Bryan, Mr. A. D. Daysh, Mr. H. W. Mackrill, Mr. A. S. Roxburgh, Mr. S. C. Seager and Mr. H. A. Smith; secretary, Mr. J. Davidson Pratt.

Paper Pulp from Straw

Satisfactory Material Cheaply Produced by Special Caustic Treatment

THE manufacture of pulp suitable for paper from straw is described by Escorrou (*Chimie et Industrie*, 1939, *41*, 447-452). The straw is cut into pieces about 2 cm long, and is then digested in sodium hydroxide solutions at atmospheric pressure, the temperature being 65-70° C.

The treatment is carried out with four different caustic solutions on the counter current system, the first liquor being very weak (3gm. per litre), so weak in fact that all the hydroxide content is absorbed, and the liquor at the end of the digestion is neutral. The next two liquors are somewhat stronger, and all three are solutions that have been previously used. The final treatment is with very strong fresh caustic. In between each treatment the straw is pressed as free as possible of adhering liquor, and in the digestions it is desirable to have some form of agitation, as otherwise a uniform degree of de-incrustation will not be attained and the treated pulp will require an excessive amount of bleaching afterwards. After the final bath (the total digestion time is 9 days), the pulp is washed free of alkali, and is then bleached with 10-15 per cent. of its (dry) weight of bleaching powder. After washing it is then ready for the papermaker.

Properties of the Product

The consumption of alkali is about 11-12 per cent. of the initial straw weight, and the recovery of cellulose is about 45 per cent. of the straw. The mechanical properties of the pulp are far superior to those of the product of pressure cooking of straw with soda or bisulphite, so that the former can be used for paper making but the latter only for filling. The difference is seen under the microscope to be due to a much greater average fibre length of the pulp prepared by the new method. The new pulp appears to be also almost as good as that obtained from wood by bisulphite cooking, so that it can replace it to a large extent, a matter of importance for an agricultural country like France, where straw is plentiful and cheap, while wood is not so. It is shown that the whole cost of straw and chemicals for the production of a given weight of pulp is only about 70 per cent. of the cost of the wood alone required to produce the same amount.

Letters to the Editor

Storage of Radium in War Time

SIR,—Radium is not only a valuable but also a very dangerous substance. If, during an air raid, any quantity of radium was dispersed by violence, the buildings in which it was dispersed, as well as a considerable area surrounding the buildings, would be for many years to come a menace to any people who inhabited them. One-hundredth of a milligramme would probably be fatal if inhaled.

It is therefore necessary that steps should be taken to provide for the safe custody of radium in war time, and a conference has been held between representatives of the British X-ray and Radium Protection Committee, King Edward's Hospital Fund for London, the Ministry of Health and the National Radium Commission, to consider this matter.

The National Radium Commission is compiling a register of owners and holders of radium, with a view to satisfactory arrangements being made. The Commission earnestly requests all persons who have radium in their custody or possession (including the responsible official of institutions holding radium) to notify the Commission, stating the amount of radium held.—Yours faithfully,

GEORGE F. STEBBING, M.B., F.R.C.S.,
Secretary.

National Radium Commission,
18 Park Crescent,
Portland Place, London, W.1.

New Technical Books

SPECTROGRAPHIC ANALYSIS IN GREAT BRITAIN. A. C. Candler. Pp. 80. London: Adam Hilger, Ltd. 7s. 6d. net.

This book is a record of the progress of spectrographic analysis in certain large industrial firms and its application to art, archaeology and crime. The various sections and sub-sections are written by experts of the manufacturers represented, and cover a wide range of subjects varying from the examination of alloy-steel to that of soil. As the introduction correctly states, "the work has been carried out with a variety of aims; some have been concerned only with a routine check on material passing through a works, others with increasing the accuracy of the technique or extending its scope." The reader thus will realise very quickly that the work is unique in spectrographic literature, being, not as might have been supposed from the title, a record of methods, but rather a record of applications. An alternative title might well have been "The Spectrograph in Action Throughout British Industry."

The first chapter, or sub-section, is by Mr. H. W. Brownsdon, of Messrs. I.C.I. Metals. Here are his opening words: "After ten years experience of spectrographic methods for the examination of materials it is no exaggeration to say that the spectrograph must be considered as one of the most useful and essential instruments in the laboratory, for without it it would be impossible to obtain quick and accurate knowledge of the composition of materials." He then proceeds to show very convincingly the reasons for this statement. Twenty-seven experts follow from various branches of industry and science each echoing the same sentiments, and one rises from the perusal of the book with the question "Why then, is the spectrograph not as frequently found in practice as, say, the saccharimeter in a sugar factory or an X-ray apparatus in a hospital?" The answer one gathers is two-fold, first, because of the considerable cost of the necessary apparatus, and secondly because of the specialised technique. It is to be hoped that this small work will stimulate the educational authorities to help to overcome the latter difficulty by the inclusion of the subject in their curricula, and that industrialists will take heart of grace by remembering that first-class British instruments last a life time.

The general arrangement of the text is as follows: Section I, Metallurgy, including sub-sections on alloy steel, lead and copper, zinc and cadmium, aluminium and light alloys, precious metals; Section II, Glasses, paints and fabrics; Section III, Soils; finally Section IV on art, archaeology and crime. Not the least interesting section is the last. "Bringing Home a Crime" is of general appeal, and there are many instances where the spectrograph is of value to the police. Mr. Candler is to be congratulated on gathering together such a mass of valuable evidence concerning British spectrography with modern instruments.

BRITISH PLASTICS YEAR BOOK, 1939. Volume IX. Pp. 584. London: Plastics Press, Ltd. 15s.

Dealing exclusively with plastic materials and their products, the ninth volume of this Year Book has the same arrangement of sections as in previous years, but the Manufactured Products section has been remodelled. It is four years since a résumé was given in the book of the materials available in the plastics industries, and during that period so many improvements have been made in the older materials, and several new ones have made their appearance, that it has been considered advisable to restate the facts. The Proprietary Names section of the book has again increased.

The Chemical Age Lawn Tennis Tournament

Entries Close on Tuesday

Only three days remain for competitors to enter for THE CHEMICAL AGE Lawn Tennis Tournament, details of which were published on March 18. Entries must be sent in by Tuesday next (first post). The tournament, for which there is no entrance fee, comprises men's singles and doubles, open to members of the chemical industry throughout Great Britain, either principals or members of staffs. THE CHEMICAL AGE silver challenge cups are held by the winners for twelve months, and statuettes are presented outright to the winners and runners-up.

The entry form, when completed, should be cut out and sent to The Editor, THE CHEMICAL AGE, Bouverie House, 154 Fleet Street, London, E.C.4. (Telephone: Central 3212).

Entry Form

We have read the Rules of THE CHEMICAL AGE LAWN TENNIS Tournament, as published in THE CHEMICAL AGE of March 18, 1939, and agree to abide by them.

SINGLES

Name of Competitor.....
(BLOCK LETTERS)

Name of Firm.....

Firm's Address.....

.....

Telephone No.....

DOUBLES

Name of Competitor.....
(BLOCK LETTERS)

Name of Firm.....

Firm's Address.....

.....

Telephone No.....

Name of Competitor.....
(BLOCK LETTERS)

Name of Firm.....

Firm's Address.....

.....

Telephone No.....

For singles, only the left portion of the form must be used.

British Overseas Chemical Trade in March

ACCORDING to the Board of Trade returns for the month ended March 31, 1939, imports of chemicals, drugs, dyes and colours were valued at £1,387,730, an increase of £218,435 as compared with March, 1938. Exports were valued at £2,106,823, as compared with £1,969,366, an increase of £137,457. Re-exports were valued at £47,678.

Imports

	Quantities. March 31, 1938.	Quantities. March 31, 1939.	Value. March 31, 1938. £	Value. March 31, 1939. £
Acids—				
Acetic .. .. cwt.	7,308	12,270	8,551	15,239
Boric (boracic) .. ,,	3,480	2,700	3,864	2,905
Citric .. .. ,,	1,021	1,941	4,183	7,941
Tartaric .. ,,	1,715	2,775	7,848	12,910
All other sorts .. value	—	—	8,569	12,273
Borax .. .. cwt.	18,789	13,099	11,773	8,043
Calcium carbide .. ,,	94,932	143,362	50,175	68,889
Fertilisers, manufactured tons	4,369	5,788	16,250	18,448
Potassium compounds—				
Caustic and lyes cwt.	11,449	15,179	12,278	16,170
Chloride (muriate) ,,	78,482	59,045	25,647	20,051
Kainite and other potassium fertiliser salts cwt.	171,661	135,060	22,554	18,387
Nitrate (saltpetre) ,,	1,667	2,907	1,603	2,675
Sulphate .. ,,	29,090	158,012	13,396	72,905
All other compounds ,,	10,248	19,084	13,217	24,708
Sodium compounds—				
Chlorate .. .. ,,	2,124	2,120	2,411	2,277
Chromate and bichromate .. .. cwt.	4,465	1,217	5,100	1,646
Cyanide .. ,,	4,261	—	10,007	—
Nitrate .. .. ,,	179,212	200,359	40,928	47,979
All other compounds ,,	13,272	19,705	12,115	12,998
Chemical manufactures value	—	—	404,900	346,892
Drugs, medicines and medicinal preparations—				
Manufactured or prepared—				
Quinine and quinine salts .. .. oz.	38,149	118,121	3,416	10,988
Medicinal oils .. cwt.	4,447	3,063	11,008	6,912
Proprietary medicines value	—	—	88,395	73,142
All other sorts .. ,,	—	—	48,930	40,608
Finished dye-stuffs obtained from coal tar cwt.	3,569	5,648	119,695	195,700
Extracts for dyeing ,,	3,299	6,509	6,544	16,242
Extracts for tanning—				
Chestnut .. ,,	28,842	25,217	18,361	17,740
Quebracho .. ,,	13,708	46,648	12,411	42,776
All other sorts .. ,,	26,156	52,826	22,081	43,382
All other dyes and dyestuffs .. .. cwt.	1,304	1,400	27,790	36,034
Painters' and printers' colours and materials, not elsewhere specified—				
White lead (basic carbonate) .. cwt.	6,942	4,650	9,501	6,329
Ochres and earth colours cwt.	91,457	77,760	21,924	19,378
Bronze powders and other metallic pigments .. cwt.	1,272	1,454	10,012	11,376
Carbon blacks .. ,,	30,278	65,350	38,637	85,774
Other pigments and extenders, dry .. cwt.	39,018	58,885	9,467	13,079
Lithopone .. ,,	27,673	25,375	16,946	15,103
All other descriptions ,,	11,107	18,134	28,808	39,831
Total .. .. value	—	—	1,169,295	1,387,730

Exports

	Quantities. March 31, 1938.	Quantities. March 31, 1939.	Value. March 31, 1938. £	Value. March 31, 1939. £
Acids—				
Citric .. .. cwt.	2,370	2,420	10,106	10,861
All other sorts .. value	—	—	29,051	19,478
Aluminium compounds tons	2,326	3,408	25,515	37,680
Ammonium compounds—				
Sulphate .. tons	33,469	38,650	215,793	253,886
All other sorts .. ,,	640	1,152	11,360	19,288
Bleaching materials—				
Bleaching powder (chloride of lime) .. cwt.	51,865	42,252	14,700	12,914
All other sorts .. ,,	2,870	6,108	7,648	15,962
Coal tar products—				
Cresylic acid .. galls.	175,710	134,756	28,673	14,866
Tar oil, creosote oil ,,	2,940,253	2,378,133	77,127	42,249
All other sorts .. value	—	—	22,063	11,731
Copper, sulphate of tons	4,606	5,488	78,595	91,925
Disinfectants, insecticides, etc. .. .. cwt.	28,647	37,836	60,018	79,893
Fertilisers, manufactured tons	16,123	15,449	65,646	81,077
Glycerine .. .. cwt.	11,926	6,291	46,266	13,589
Lead compounds .. ,,	14,761	12,059	20,269	17,626
Magnesium compounds tons	400	602	10,296	14,544
Potassium compounds cwt.	5,902	4,684	8,275	7,653
Salt (sodium chloride) tons	16,240	16,421	49,636	47,421
Sodium compounds—				
Carbonate, including soda crystals, soda ash and bicarbonate cwt.	333,503	478,347	84,428	109,523
Caustic .. .. ,,	135,170	211,427	73,818	108,601
Silicate (water glass) ,,	23,546	15,958	6,511	5,106
Sulphate, including salt cake .. .. cwt.	12,568	26,862	2,072	3,369
All other sorts .. ,,	44,726	68,516	86,774	93,474
Zinc oxide .. tons	1,109	1,559	21,515	27,881
All other descriptions value	—	—	197,723	218,365
Drugs, medicines and medicinal preparations—				
Quinine and quinine salts .. oz.	130,516	141,540	13,970	15,401
Proprietary medicines value	—	—	111,679	117,168
All other descriptions value	—	—	144,188	155,241
Dyes and dye-stuffs and extracts for dyeing and tanning—				
Finished dye-stuffs obtained from coal tar—				
Alizarine, alizarine red and indigo (synthetic) cwt.	1,361	505	9,259	3,736
Other sorts .. ,,	5,988	6,462	100,144	97,898
Extracts for tanning ,,	14,572	21,928	14,215	20,011
All other descriptions ,,	1,937	2,663	7,526	8,337
Painters' and printers' colours and materials—				
Ochres and earth colours cwt.	9,722	8,596	9,249	9,179
Other descriptions ,,	7,191	8,003	24,351	28,405
White lead .. ,,	3,144	5,835	6,627	11,717
Ships' bottom compositions .. .. cwt.	2,927	3,404	9,693	12,510
Lithopone .. ,,	8,575	10,931	6,131	7,772
Paints and painters' enamels .. .. cwt.	43,393	40,309	124,812	113,959
Varnish and lacquer (clear) galls.	77,079	67,414	32,253	27,997
Printers' ink .. cwt.	4,323	5,596	24,777	27,642
All other descriptions ,,	37,956	44,801	76,614	90,888
Total .. .. value	—	—	1,969,366	2,106,823

Re-Exports

	Quantities. March 31, 1938.	Quantities. March 31, 1939.	Value. March 31, 1938. £	Value. March 31, 1939. £
Chemical manufactures and products .. value	—	—	16,816	24,306
Drugs, medicines and medicinal preparations value	—	—	11,413	19,893
Dyes and dye-stuffs and extracts for dyeing and tanning .. .. cwt.	198	391	932	1,932
Painters' and printers' colours and materials cwt.	709	892	1,689	1,547
Total .. .. value	—	—	30,850	47,678

RECENT TRADE LITERATURE

WILD-BARFIELD ELECTRIC FURNACES, LTD., have issued a revised edition of their catalogue dealing with small works and laboratory furnaces. Covering all those types of most common interest and application the catalogue describes and illustrates in a most comprehensive manner rectangular, oval, vertical, melting, high temperature, vertical crucible, laboratory tube and self-contained oval furnaces, temperature controllers and pyrometers.

General Bulletin B.10 issued by NEGRETTI AND ZAMBRA is a 60-page booklet which presents an interesting digest of descriptions and specifications of the company's wide range of products which extend from the simple mercury-in-glass thermometer through a series of indicating and recording instruments to completely engineered control schemes involving the use of a number of inter-related instruments and fully stabilised controllers. In all, nearly 60 types of instruments are included in the booklet.

The advantages of Welwyn as an industrial centre are emphasised in a new brochure issued by WELWYN GARDEN CITY, LTD. It contains numerous illustrations of industries and factories already established including a view of the laboratories of Roche Products, Ltd., a section of the works of British Lead Mills, Ltd., and a similar view of the works of Gerald Carter and Co., Ltd., manufacturers of paints, varnishes, etc. Reference is also made to the fact that building construction is proceeding at Welwyn on the new works of I.C.I. (Plastics), Ltd.

One of the problems of rubber parts subjected to friction has, up to now, been their lubrication. Ordinary lubricating oil cannot be used, because it tends to attack rubber, while many of the alternatives in general use have some disadvantage or other. In this connection E. G. ACHESON, LTD., have introduced a new lubricant for rubber, details of which have been recently issued by the company. The lubricant, which is patented, involves the use of "Dag" colloidal graphite in glycerine and water. The glycerine and water, themselves lubricants, act as a carrier for the microscopic slippery particles of graphite. The latter form a slippery surface on the rubber which provides not only highly efficient but lasting lubrication. In addition, however, the rubber is protected from much oxidation and abrasive wear and is kept in good condition.

THE POWER-GAS CORPORATION, LTD., AND ASHMORE, BENSON, PEASE AND CO., LTD., of Parkfield Works, Stockton-on-Tees, have for over 40 years supplied many processes and plants for the production, treatment, and storage of fuel gas and other industrial gases. Of late, there has been much development of those processes which use as a staple material hydrogen, or a mixture of hydrogen in some predetermined proportion with nitrogen or carbon monoxide. The two companies have taken a prominent part in this development, and in recent years have supplied numerous plants for the production of hydrogen and other gases at home and abroad. Some of these plants are illustrated and their operation is described in a recently issued booklet. Among them, the water-gas plant at Billingham is probably the largest single installation in the world, and includes generator units which are believed to be the largest so far built.

CHEMICAL CLUB

An informal dinner, winding up the winter series of meetings, will be held on Monday, April 24, at 7.30 p.m. The last of the informal talks was given by Mr. Blair on March 20, his selection of films being very much appreciated. The dinner on April 24 will be for members and their guests. There will be no special dress, no special charges, and complete informality. On May 5 the first golf meeting will be held at the R.A.C. Country Club, Woodcote Park, Epsom. Those wishing to play should notify Mr. F. H. Braybrook at the Chemical Club, 2, Whitehall Court, London, S.W.1.

PERSONAL NOTES

DR. R. S. EDWARDS has been elected a director of the Co-operative Wholesale Society in succession to the late Mr. A. Marlow.

* * * *

MR. PETER F. B. BENNETT, O.B.E., J.P., was re-elected president of the Federation of British Industries for a second year of office at the Federation's annual general meeting on Wednesday.

* * * *

DR. WILLIAM CULLEN, past president of the Institution of Chemical Engineers, has been appointed a member of the Industrial Chemistry Committee by the Central Register Advisory Council.

* * * *

DR. T. MORAN, principal scientific officer at the Low Temperature Research Station, Cambridge, has been appointed director of research of the Research Association of British Flour Millers. He will take up his duties at the laboratories of the Association in St. Albans on June 1.

* * * *

MAJOR H. E. CRAWFORD has been appointed director of the National Federation of Scrap Iron and Steel Merchants, subject to approval at the next annual meeting of the Federation. Major Crawford will carry out executive duties for the Federation, but control will remain with the present elected officials.

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LORD TRENT, chairman and managing director of Boots Pure Drug Co., Ltd., and associated companies, has been appointed commissioner for the North Midland, Nottingham, region to direct civil defence on behalf of the Government in war-time. The EARL OF DUDLEY, president of the British Cast Iron Research Association and of the Iron and Steel Institute has been appointed commissioner for the Midland, Birmingham, region.

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MR. WILFRED BESWICK was elected chairman of the Power-Gas Corporation, Ltd., in succession to the late Mr. Emile Mond, at a meeting of the board of directors of the company held on April 14. Mr. Beswick has been a vice-chairman of the company and was formerly the managing director for a number of years. He has been also elected chairman of Ashmore, Benson, Pease and Co., Ltd., which is a subsidiary of the Power-Gas Corporation, Ltd., and he is chairman of Davison and Partner, Ltd., which is an associated company.

OBITUARY

MR. HERBERT JOHN GEORGE, University Lecturer in Chemistry and Fellow of Jesus College, Oxford, died on Wednesday at the age of 46.

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MR. ERNEST EDWARD MARSHALL, chairman of the Anglo Metal Co., Ltd., died on April 16 at the age of 61. Mr. Marshall had been chairman of the company since its incorporation.

* * * *

MR. REGINALD WALTER PRESTON, a director of the Distillers Co., Ltd., and several of its subsidiaries, has died at the age of 74. He was also on the board of other companies, including the Liverpool Adhesive Paste and Emido Co.

TO-DAY'S ANNIVERSARY

ANTON GEUTHER, born April 22, 1833, was the first to study the reactions of acetoacetic ester, independently discovered by him in 1863, and by E. Frankland and B. F. Duppa. He was professor of chemistry at Jena at the time. Geuther prepared acetoacetic ester by the condensation of ethyl acetate in the presence of sodium; this method is identical with that used at the present time.

References to Current Literature

Inorganic

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Identification of the clay minerals. Norton, *J. Amer. Ceramic Soc., 22,* 54-63.

Developments in the inorganic chemical industry. Walser, *Chem. Fabrik, 12,* 129-135.

Chemically treated water for high pressure boilers. Wesley, *Chem. Fabrik, 12,* 137-142.

Removal of iron by lignin in water treatment. Nelson, Levine and Lynch, *Paper Trade J., 108,* No. 9, 29-32.

Rate of dissolution of aluminium in soda lye. Straumanis and Brakks, *Korrosion u. Metallsch., 15,* 5-11.

Reduction of silver ions by hydroquinone. James, *J. Amer. Chem. Soc., 61,* 648-652.

Organic

Phenols and cresols from hard coals. Moehrle and Bauerfeld, *Angew. Chem., 52,* 185-186.

Recovery of glycerin. Wigner, *Soap Perfum. Cos., 12,* 231-236, 268.

Pyrolysis of ethylene. Schultze and Schultze, *Oel u. Kohle, 15,* 193-198, 215-220.

Naphthyl acetic acid. Cambron, *Canadian J. Res., 17,* B, 10-13.

Starch research. Samec and Blinc, *Kolloid Beihefte, 49,* 75-314.

Nickel, cadmium and lead sulphide catalysts in the reduction of nitrobenzene. Brown and Raines, *J. Phys. Chem., 43,* 383-386.

Analysis

Titrimetric determination of silver in presence of antimony. Bodnar, Szep and Cieleszky, *Z. analyt. Chem., 115,* 412-420.

Gravimetric determination of copper. Spacu, *Z. analyt. Chem., 115,* 423-425.

Colorimetric determinations in the metallurgy of aluminium. Urech, *Helv. Chim. Acta, 22,* 322-334.

Determination of starch in paper. Simerl and Browning, *Ind. Eng. Chem. analyt. ed., 11,* 125-126.

Determination of carbon dioxide. Roller and Ervin, *Ind. Eng. Chem. analyt. ed., 11,* 150-153.

Electrolytic determination and separation of bismuth. Kny-Jones, *Analyst, 64,* 172-175.

Volumetric determination of sulphur. Josephson, *Analyst, 64,* 181-185.

Mineral Oils, Gas, Tar

Insulating oil deterioration. Balsbaugh and Oncley, *Ind. Eng. Chem., 31,* 318-326.

Asphalt in motor oil. Graefe, *Petroleum Z., 35,* 178-179.

Gas temperature measurement. *J. Inst. Fuel (special issue), 12,* S 1-107.

Synthetic gas from brown coal. Dolch, *Brennstoff Chem., 20,* 101-111.

Vapour-phase cracking of gas-oil. Cambron and Bailey, *Canadian J. Res., 17,* B, 23-35.

Cellulose, Paper

Action of nitric acid on cellulose. Fabel and Fritzsche, *Nitrocellulose, 10,* 3-5, 24-26.

Resistance of paper to natural ageing. Hanson, *Paper Ind., 20,* 1,157-1,163.

Nitrocellulose sols. Waele, *J. Oil Col. Chem. Assoc., 22,* 57-72.

Temperature and the sorption of sodium hydroxide on wood. Lusby and Maass, *Canadian J. Res., 17,* B, 36-39.

Removal of the constituents of wood in the alkaline cooking process. Brauns and Grimes, *Paper Trade J., 108,* No. 11, 40-43.

Bitumen in the paper industry. Nüssel, *Wochenblatt f. Papierfabrik., 70,* 177-180.

Calendering of pulp. Brecht, *Paper Maker, 97,* TS 41-52.

Bleaching, Dyeing, Finishing

Evaluation and testing of colours and dyestuffs. Eilers, *Farbe u. Lack,* 1939, 89-90, 90-100, 111-112.

Surface active agents in dyeing. Smith, *Amer. Dyestuff Reporter, 28,* P 146-155.

Determining grease in scoured wools. Creely, *Amer. Dyestuff Reporter, 28,* P 161-162.

Dyeing of natural silk on metallic mordants. Rebut, *Rev. Univ. Soie Text. Art., 14,* 67-70.

Drying of cellulose artificial wool. Haas, *Kunstseide u. Zellwolle, 21,* 88-90.

Glass, Ceramics

Characteristics of refractories. Hyslop, *Metal Treatment, 4,* No. 16, 150-152.

Annealing in a sulphur dioxide containing atmosphere. Boow and Turner, *J. Soc. Glass Techn., 22,* 357-371.

Equilibrium between ferrous and ferric oxides in glasses. Densem and Turner, *J. Soc. Glass Techn., 22,* 372-389.

Action of potash mica in porcelain. Rieke and Wen, *Ber. Deutschen Keram. Ges., 20,* 43-73.

Automatic control in the glass plant. Drake, *Glass Ind., 20,* 87-94.

Metals, Electrometallurgy

Oxide protective films on aluminium and its alloys. Schiek, *Korr. u. Metallschutz, 15,* 37-40.

Temper hardening of steels. Main, *Metal Treatment, 4,* No. 16, 158-164.

Phosphate pretreatment in the finishing of sheet steel. Halls, *Metal Treatment, 4,* No. 16, 170-174.

Filtration of electroplating solutions. Meyer, *Metal Ind. (U.S.A.), 37,* 117-121.

Colouring of cadmium. Erskine, *Metal Ind. (U.S.A.), 37,* 123-124.

The system aluminium—zinc. Guertler, Krause and Voltz, *Metallwirtsch., 18,* 97-100.

Fats, Oils, Waxes

Fatty alcohols and their sulphates. Jannaway, *Perf. Essen. Oil Rec., 30,* 45-49.

Manufacture of solidified oils and high pressure lubricants. Maass, *Seifensieder Ztg., 66,* 172-174.

Emulsifying agents and technical emulsions. Kadmer, *Seifensieder Ztg., 66,* 171-172, 195-196, 215-216.

Soap texture. Silman, *Soap, 15,* No. 4, 23-25, 72.

Anti-oxidants. Harry, *Manuf. Perfumer, 4,* 82-85.

Paints, Pigments, Resins

Film investigations with lacquers and emulsions. Wagner and Fischer, *Farben Ztg., 44,* 329-331, 357-359.

Thixotropy and its measurement in printing inks. Whitfield, *Paint Manuf., 9,* 80-82.

Rubber, Plastics

Rubber from dialysed latex. Stevens and Rowe, *J. Soc. Chem. Ind., 58,* 116-122.

Developments in rubber powders. Parris, *India Rubber World, 100,* No. 1, 41-42.

Rubber vulcanising properties of colloidal carbons. Wiegand and Snyder, *India Rubber World, 100,* No. 1, 50-53.

Miscellaneous

Liquid dielectrics containing lead and copper soaps in liquid paraffin: Piper, Fleiger, Smith and Kerstein, *Ind. Eng. Chem., 31,* 307-317.

Active carbon. Singer, *Seifensieder Ztg., 66,* 55-57, 75-77.

Toxic gas and vapours. McClurkin, *Oil Col. Trades J., 95,* 1,079-1,081.

General News——————From Week to Week

MORNY, LTD., perfumery and cosmetic manufacturers, are to erect a new factory at Ealing.

THE PREMISES OF E. C. LONGMATE, LTD., manufacturing chemists, King's Lynn, were gutted, when an outbreak of fire occurred there last week. Firemen were busy at the premises for several hours.

A THREE-STOREY BUILDING in Glasgow, occupied by John Baird, Ltd., glass manufacturers, was damaged by fire on April 15. Fire broke out on the top floor and spread to a section used partly as a store.

EXTENSIONS to the Willesden factory of the Triplex Safety Glass Co., Ltd., are nearing completion, and it is expected that the new offices will be ready in May and the rest of the work will be finished by June.

A SITE OF ABOUT EIGHT ACRES at Leatherhead, Surrey, on which will be built new research laboratories, has been acquired by the Research Association of British Rubber Manufacturers. The Association's present laboratories are at Croydon.

THE TREASURY HAVE MADE AN ORDER under Section 10(5) of the Finance Act, 1926, exempting dimethylamine and trimethylamine from Key Industry Duty from April 19 until December 31, 1939. Copies of the Treasury Order, which is entitled The Safeguarding of Industries (Exemption) No. 2 Order, 1939, may be obtained from H.M. Stationery Office.

THE IMPROVED EMULSIFICATION PROCESS CO., LTD., of Brentford, Middlesex, has become a subsidiary of The Brush Electrical Engineering Co., Ltd., and the entire manufacturing and selling organisation has been removed to Loughborough, Leicestershire. The company, which in the past, has marketed the Impulsor emulsifier, will also handle the Brush homogeniser, and a wider range of emulsifying machinery is now available.

THE PASCALL ENGINEERING CO., LTD., are removing their London laboratory and test station from 20 Dean Street, W.1, to more commodious premises at Hyde Street, W.C.1. The change over will be effected as from May 1, and it has been rendered necessary by the need for increased accommodation, the demands on the company's present test station facilities having outgrown its capacity.

A FACTORY FOR THE MANUFACTURE of soaps, margarine, essential oils, etc., is to be established at Falkirk, by a prominent Czecho-Slovakian industrialist, Mr. Heikorn. The Falkirk Town Council have received an inquiry from the London manager of the Scottish Development Council, stating that Mr. Heikorn wishes to obtain a site of 9 acres in the Falkirk area, with an option on a further 15 to 20 acres, for the purpose of erecting the factory. Mr. Heikorn was one of the largest manufacturers of margarine, soaps and oils in Czecho-Slovakia.

IMPERIAL CHEMICAL INDUSTRIES, LTD., has announced a scheme which it proposes to apply to employees engaged in H.M. Forces in the event of war. The difference between any man's net remuneration from the company and the remuneration (inclusive of marriage allowance) which he would receive while serving (with an adjustment for his estimated saving in food and clothes), shall be paid in full to a married man, and to the extent of one-third to single men without dependents. The cases of single men with dependents will be considered on their merits. In addition the company intends to maintain their membership in the various pension funds. Every possible effort will be made to reinstate in employment those serving in the forces at the conclusion of that service.

I.C.I. (REXINE), LTD., have opened showrooms at 3 Bruton Street, W.1, to inaugurate Mural Rexine, a new and striking change in an old and familiar material. Rexine has been known for many years as the leathercloth or "imitation leather" of the furnishing trade. Now a further development in the production of new colours and effects fast to washing and exposure transforms it into Mural Rexine, a material with extraordinary possibilities for the interior decoration of public and private buildings. In addition to possessing the practical advantages of durability and cleanliness common to all Rexine materials, Mural Rexine can be supplied with the surface finish of a glazed tile, of a finely ribbed silk, with jaspe, moire or designed effects; and in a range of patterns and colours previously associated only with fabrics, wallpaper or marble.

THE ARTHOL MANUFACTURING CO., LTD., makers of synthetic perfumes, etc., are to have additions made to their Sealand Road (Chester) factory.

MONO PUMPS, LTD., manufacturers of the Mono rotary self-priming pump, who are associated with John North (Founders and Engineers) Ltd., have recently completed the acquisition as a going concern of J. & E. Arnfield, Ltd., the old-established firm of general and textile engineers of Audenshaw, near Manchester.

THE DUNLOP RUBBER CO., LTD., have announced that one week's pay will be given to employees who join the Territorials before June 15. In addition each of them will also get full pay for his two weeks in camp. Hundreds of copies of their own recruiting posters are being shown in the company's offices and factories throughout the country.

THE SECOND ANNUAL REPORT for 1938-39 of the Joint Committee on Materials and Their Testing of Technical Institutions and Societies in Great Britain states that there are now 26 institutions and societies which collaborate in the work of the Committee, the Institution of Chemical Engineers having joined during the year. The report states also that the Committee will hold two discussions each year, the venue alternating between London and a provincial centre.

MR. CHARLES A. HILL, chairman and managing director of The British Drug Houses, Ltd., referred to the difficulties of export trading in his speech at the Company's annual general meeting on Tuesday. He summed up the motion by saying that export trading continued to be hampered by one restriction after another. These had increased to such an extent and were of such a nature as to make it impossible for manufacturers themselves to cope with the difficulties. They had now reached the stage when only Government intervention could furnish effective assistance.

AT THE ANNUAL MEETING of United Glass Bottle Manufacturers, Ltd., last week, Sir Max Bonn, the chairman, disclosed that the company had arrived at a broad understanding for a technical liaison regarding containers and closures with the Owen's Illinois Glass interests in the United States. "From the very size of their research work and the larger scope of their manufacturing operations, we should be the gainers; nevertheless, I am confident that, thanks to our technique and new developments, it will not be an entirely one-sided arrangement," he added.

THE RECENTLY ISSUED VOLUME of the Journal of the Royal Technical College, Glasgow (volume 4, part 3), a record of some of the research work carried out in the College by the staff and senior students, contains the following papers *inter alia*, the Release of Air Dissolved in Water (by A. G. Sillitto); Correlation of Adsorption and Catalytic Activity. Part I, Hydrogen Adsorption in Zinc-Chromium Catalysts (by F. Rumford); The System FeO-TiO_2 (by J. Grieve and J. White); Viscosity Determinations of Slag Systems (by J. R. Rait, Q. C. M'Millan, and Professor R. Hay); On the Fusion Point of Coal Ash (by J. Hamilton and W. Miller); and Extraction of Alkaloids from Homogenised Cinchona Bark (by W. M. Hughes). The price of the volume is 10s. 6d.

Foreign News

THE FIRST ITALIAN SYNTHETIC RUBBER PLANT will be laid down later this year in the industrial zone of Ferrara.

THE EXTRA IMPORT DUTIES imposed by the Government of the Netherlands in 1935 on imports of zinc oxide and lithopone have this year been extended for a period of six months. Previously these duties have been extended for yearly periods.

THE PRESERVATION OF VALUABLE DOCUMENTS by the process of laminating paper with transparent cellulose acetate sheeting is being increasingly adopted in the United States, where the idea was first developed several years ago by the National Bureau of Standards. The National Archives of the United States were the first to apply the process to their documents. The sheeting is applied by means of heat and pressure and a homogeneous unit is obtained as the cellulose sheeting is actually forced into the pores of the paper.

A NEW ALCOHOL FACTORY with an annual output capacity of about 3½ million gallons is under construction in Formosa, Japan.

PERMISSION TO MANUFACTURE GAS MASKS has been granted by the Dutch authorities to the Vereenigd Industrieel Bezit Veritex V.N. of Nieuw-Milligen.

THE DEPRESSION SUFFERED BY THE DYE TRADE IN CHINA during 1938 is attributed to military activities which have made trading increasingly difficult for both suppliers and distributors. Sales were far below 1937 and dyestuff importers estimate the consumption of dyestuffs during 1938 was approximately 50 per cent. of that in 1937.

FOR THE FOUR MONTHS commencing April 1 and ending July 31, the Japanese Ministry of Agriculture have imposed fertiliser quotas which provide for the importation of 300,000 tons of phosphate rock and 90,000 tons of potassium chloride. The amounts scheduled for the period January-March were 200,000 and 70,000 tons respectively.

THE NETHERLANDS COAL TAR INDUSTRY, which is of recent origin, exported 77,931 metric tons of coal tar derivatives during 1938. It is estimated that the country has an annual production of 55,000 tons of pitch and 25,000 tons of benzol. In addition it is expected that the production of trichlorenthylene, which was inaugurated in 1937, will develop into an export industry.

A NEW ITALIAN PROCESS FOR THE MANUFACTURE OF CREASELESS FABRICS is reported to be based upon the use of a melamine-formaldehyde resin. Fabrics are treated with a solution formed by reacting 20 parts melamine in hot water with 60 parts 40 per cent. formaldehyde. The impregnated material is washed, dried at low temperature and finally heated for a short time at 150° C.

IN THE NETHERLANDS INDIES last year imports of chemical products were reduced and there were no new local chemical developments of importance during the period. Total imports of chemicals and related products were recorded at 201,834 metric tons during 1938, which compared with 259,049 tons during the preceding year. Imports of chemicals utilised by the rubber industry, including alum, acetic and formic acid, were much smaller in 1938, and despite the increase in petroleum output, a reduction took place in the import volume of caustic soda. Statistics indicate that imports of other leading industrial chemicals were from 40 o 50 per cent. lower. No important change was noted during the year in the relative importance of the country's three most important chemical supplying countries, Germany, the Netherlands and the United States.

"NEW SURFACE-ACTIVE CHEMICALS," a discussion of wetting agents and their uses in the paper industry, was the subject of a paper presented by B. G. Wilkes and H. F. Robertson, of the Mellon Institute of Industrial Research, at the annual meeting of the Technical Association of the Pulp and Paper Industry held recently in New York. Wetting agents were described as polar compounds, the molecules of which have water-repellent hydrocarbon groups to which are attached other groups possessing a pronounced affinity for water. As examples of these wetting agents, the Tergitol penetrants, which are the sodium salts of certain alcohol sulphates, were cited as especially effective. Tests demonstrated that a primary polar compound (whose polar grouping is located at the end of the non-polar portion of the molecule) is relatively mediocre in its wetting and penetrating action as compared with a secondary polar compound (whose polar grouping is located away from either end).

THE BUREAU OF MINES of the United States Department of the Interior reports that except for a sharp decline in borax shipments, due in part to greatly reduced exports, recoveries of natural sodium compounds, other than common salt, from brines and saline deposits in the United States were well-maintained in 1938, faring better in this respect than the production of similar compounds from chemical plants. Sales of natural sodium sulphate increased slightly in quantity to 80,210 short tons valued at $596,812, compared with 80,053 tons with a value of $599,266 in 1937. Natural sodium carbonates (chiefly soda ash but also bicarbonate and trona) sales, although declining 4 per cent. in quantity, increased 4 per cent. in value, amounting to 100,010 tons worth $1,235,328 as against 104,711 tons valued at only $1,191,485 in the preceding year. Production of sodium borates in 1938 amounted to 219,513 tons valued at $4,570,316, a 39 per cent. decrease in tonnage from the preceding year's figures.

THE SOCIETY OF CHEMICAL INDUSTRY, BASLE, achieved a net profit in 1938 of 6.96 million francs (against 5.76) and again distributes a dividend of 20 per cent.

IT IS ANNOUNCED by The Department of Overseas Trade, that as from May 1, 1939, the new office address of H.M. Senior Trade Commissioner at Sydney will be Prudential Building, 39-49 Martin Place, Sydney.

DESPITE AN EXPANSION in the chemical industry in Bolivia during 1938, it is reported that imported chemicals continued to supply the greater part of the demand. Imports came from Chile, Germany, Norway, Belgium and the United States.

PHENOL, CRESOL, ARTIFICIAL RUBBER AND ARTIFICIAL RUBBER WASTE are among the items which have been deleted from the list of goods which cannot be exported from Germany without licence, according to a decree recently issued by the Reich Minister of Economics.

UNDER THE TITLE of New Zealand Glass Manufacturers' Proprietary, Ltd., the glass manufacturing company that has been carried on in New Zealand for several years past. As a subsidiary of Australian Glass Manufacturers, Ltd., will carry on business as an independent company with a capital of £250,000. The company's plant is in Auckland.

FOLLOWING THE SUCCESSFUL OPERATION of the two large-scale experimental plants for the production of fermentation calcium citrate erected early last year by two leading German concerns, it has been decided to proceed with the construction of full-size plants which will be capable of coping with the entire German demand and will use exclusively German raw materials.

THE PRODUCTION OF CHEMICALS in Denmark during 1938 was maintained at practically the same level as in 1937. Imports increased, however, to a total value of 122,000,000 crowns, largely as a result of a limited number of articles being transferred to the free list together with emergency purchases of certain imported chemicals. The principal item in Denmark's import trade is fertilisers, imports of which increased 38 per cent. to 64,800,000 crowns in 1938, as a result of greater consumption by farmers and extraordinary purchases made by the Government to lay up stocks for use in case of emergency.

THE DOMESTIC DEMAND in France for turpentine and rosin has recently been relatively weak, the value of sales for both products being well below average. It was considered that prices were too high and consequently purchases were made only to meet immediate requirements. The establishment of an organisation to control the market and sales of naval stores products has aroused considerable discussion and it is reported that the proposal is favoured by the majority of those affected, although no views on the subject have been expressed by the pine forest owners.

New Companies Registered

Press Pharmacies, Ltd. 350,611.—Private company. Capital £100 in 100 shares of £1 each. To carry on business as manufacturers of and dealers in chemicals, drugs, gases, etc. Directors: Mrs. Phyllis R. Doctors, 5 Grosvenor Gardens, Golders Green, N.W.11; Stanley Doctors.

J. R. S. Uttley, Ltd. 351,513.—Private company. Capital £600 in 600 shares of £1 each. To carry on the business of consulting, analytical, manufacturing, pharmaceutical and general chemists, etc. Directors: Mrs. Margaret A. Uttley, 11 Bridge Street, Rotherham; Wilfred I. Uttley.

Hulls (Chemists), Ltd. 361,972.—Private company. Capital £100 in 100 shares of £1 each. To carry on the business of consulting, analytical, manufacturing, pharmaceutical and general chemists, etc. Directors: Ronald Hull, 36 High Street, Ruislip, Middlesex; John Wilmot. Registered office: 36 High Street, Ruislip, Middlesex.

Orcene Company, Ltd. 351,257.—Private company. Capital, £5,000 in £1 shares. To acquire the business of a chemical manufacturer, dealer and advisor carried on by W. F. A. Kilpatrick at Macintosh Lane, E.9. Directors: Wm. F. A. Kilpatrick, 94 Westbourne Park Road, W.2; Fredk. M. Sutcliffe. Registered office: 6a Macintosh Lane, E.9.

Denton Brothers (Keighley), Ltd. 350,297.—Private company. Capital £10,000 in 10,000 shares of £1 each. To carry on the business of dyers, finishers, shrinkers, cloth workers, sizers, mercerisers, waterproofers, and bleachers, makers of vitriol, dyeing and bleaching materials, spinners, doublers, etc. Subscribers: Mrs. Blanche H. Farnish, Chellow Mount, Chellow Dene, Bradford; Leonard B. Smith. Registered office: Keighley Dyeworks, Dalton Lane, Keighley.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

PROCESS FOR THE TREATMENT OF SILICEOUS IRON-CONTAINING MATERIALS.—C. Schunck. (Germany, March 25, '38.) 9435; (Germany, Feb. 17.) 9436.

PREPARATION OF ARTIFICIAL CRYOLITE.—Silikon Ges. Ansarbeitung und Verwertung Industrieller Verfahren. (Germany, March 30, '38.) 9793.

PROCESS FOR THE SOLVENT TREATMENT OF MINERAL OIL.—Standard Oil Development Co. (United States, June 15, '38.) 9165.

PREPARATION OF LOW VISCOSITY CELLULOSE.—W. J. Tennant. (Dow Chemical Co.). 9735.

PRODUCTION OF ARTIFICIAL RESINS from phenols and formaldehyde.—Vereinigte Chemische Fabriken Kreidl Heller and Co., Nfg. (Austria, April 26, '38.) 9472.

PRODUCTION OF DI-AMIDE, ETC., RESINS.—Vereinigte Chemische Fabriken Kreidl Heller and Co., Nfg. (Austria, April 26, '38.) 9473.

TREATMENT OF WATER.—Albright and Wilson, Ltd. (United States, July 30, '38.) 9956.

PRODUCTION OF MAGNESIUM from its compounds.—Alloy Processes, Ltd. (Armandias). 10190.

PRODUCTION OF METAL from ore.—E. F. Altenhein. 10486.

PRODUCTION OF MAGNESIUM PHENOLATES.—Bakelite Ges. (Germany, April 14, '38.) 10542.

TREATMENT, ETC., OF DRYING OILS.—E. G. C. Belbin. 10014.

METHOD, ETC., FOR THE TREATMENT OF CALCIUM SULPHIDE, ETC.—C. Boulanger, C. Leroy, and Soc. Anon. de Materiel de Construction. (Luxembourg, April 9, '38.) 10651.

SURFACE TREATMENT OF ALUMINIUM, ETC.—British Aluminium Co., Ltd., and A. N. D. Pullen. 10252.

MANUFACTURE OF WATER-INSOLUBLE AZODYESTUFFS on the fibre, etc.—A. Carpmael (I. G. Farbenindustrie.) 10017.

DYEING OF CELLULOSIC TEXTILE MATERIALS.—Courtaulds, Ltd., J. Boulton, and T. H. Morton. 10507.

MANUFACTURE OF ORGANIC COMPOUNDS.—H. Dreyfus. 9945, 10091.

PRODUCTION OF ORGANIC COMPOUNDS.—H. Dreyfus. 10462.

ELECTRODEPOSITION OF METALS.—E. I. du Pont de Nemours and Co. (United States, March 30, '38.) 10021.

PRODUCTION OF ALCOHOLS from olefines.—E. I. du Pont de Nemours and Co. (United States, April 5, '38.) 10535.

MANUFACTURE OF LUBRICATING-MATERIALS.—E. I. du Pont de Nemours and Co. (United States, April 5, '38.) 10680.

MANUFACTURE OF DISAZO DYESTUFFS.—Durand and Huguenin, A.-G. (Germany, April 4, '38.) 10329.

PREPARATION OF CATALYSTS for hydrogenation.—Fabriques de Produits Chimiques de Thann et de Mulhouse. (France, April 11, '38.) 10079.

PRODUCTION OF READILY SOLUBLE DERIVATIVES of *p*-amino benzene sulphonamide.—Fabryka Chemiczno-Farmaceutyczna Geo. Sp.z.o.o., and I. Goldwicht. 10378.

DYESTUFF, ETC.—M. Factor and Co. (United States, June 15, '38.) 10533.

PRODUCTION OF OXIDATION PRODUCTS.—W. A. Farenholtz, G. Hubbe, and H. Hubbe. (Germany, April 4, '38.) 10526.

REMOVAL OF ACID COMPONENTS from water-immiscible organic liquids.—J. G. Fife (Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij). 10008.

PROCESS FOR REMOVING ACID COMPONENTS from organic water-insoluble liquids.—J. G. Fife (Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. 10376.

PROCESS FOR REMOVING ACID COMPONENTS from hydrocarbon distillates.—J. G. Fife (Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij). 10689.

MEANS FOR ALLAYING CORROSION.—W. V. Gilbert. 10592.

FERTILISERS.—W. K. Hall, and Imperial Chemical Industries, Ltd. 10679.

MANUFACTURE OF CELLULOSE ETHERS.—Hercules Powder Co. (United States, Aug. 25, '38.) 10673.

MANUFACTURE OF WATER-SOLUBLE INJECTABLE COMPOUNDS of sulphonilic acid amide.—F. Hoffman-La Roche and Co., A.-G. (Switzerland, April 26, '38.) 10133.

DECOMPOSITION OF WATER-INSOLUBLE PHOSPHATES.—I. G. Farbenindustrie. (Germany, April 7, '38.) 10356.

DYEING OF MIXED FABRICS.—I. G. Farbenindustrie. (Germany, April 5, '38.) 10382.

PRODUCTION OF SULPHUR.—I. G. Farbenindustrie. (Germany, April 5, '38.) 10508.

MANUFACTURE OF WATER-INSOLUBLE RESINS.—I. G. Farbenindustrie. (Germany, April 6, '38.) 10613.

MANUFACTURE OF SULPHONIC ACID AMIDE COMPOUNDS.—I. G. Farbenindustrie. (Germany, April 5, '38.) 10667.

MANUFACTURE OF CALCIUM SULPHIDE, ETC.—C. Leroy, J. Bertrand, and Soc. Anon. de Materiel de Construction. (Luxembourg, April 8, '38.) 10485.

MANUFACTURE OF THIOLACTAMS.—Imperial Chemical Industries, Ltd. (United States, April 4, '38.) 10536.

PRODUCTION OF HYDROGEN.—M. W. Kellogg Co. (United States, April 18, '38.) 10556, 10557.

PRODUCTION OF DYES of the cyanine type, etc.—Kodak, Ltd. (Eastman Kodak Co.). 9896.

AQUEOUS DISPERSING, ETC., AGENTS.—Kodak, Ltd. (Eastman Kodak Co.). 9897.

MANUFACTURE OF DYES, ETC.—Kodak, Ltd. (Eastman Kodak Co.). 9899.

TREATMENT OF HIGHLY FERROGINOUS YELLOW OCHRE EARTH.—F. Kuki. 10339.

MANUFACTURE OF GELATINE.—G. A. E. Mertens. 10539.

RECOVERY OF SILVER from waste hyposulphitic liquids.—T. Muhlethaler Soc. Anon. (France, April 15, '38.) 10157.

METHOD OF INCREASING THE CREASE RESISTANCE OF TEXTILE MATERIALS.—T. Rotta, and K. Quehl. (Sept. 16, '37.) 10351.

PREPARATION OF COMPOUNDS OF CERIUM.—Soc. de Produits Chimiques des Terres Rares. (France, April 13, '38.) 10080.

SOLVENT EXTRACTION PROCESS.—Standard Oil Development Co. (United States, June 4, '38.) 9981.

MANUFACTURE OF DIESEL FUELS.—Standard Oil Development Co. (United States, July 14, '38.) 10217.

PROCESS FOR THE GRANULATION OF CALCIUM SUPERPHOSPHATE and nitrogenous-phosphatic potassic mixtures.—Sturtevant Engineering Co., Ltd., and P. Parrish. 10122.

Complete Specifications Open to Public Inspection

METHOD AND APPARATUS FOR THE IMPROVEMENT OF THE COLOUR OF THE RESIN CONTENT of light oils.—Gasbetriebsges, A.-G. Feb. 26, 1937. 6096/38.

MANUFACTURE OF CATALYSTS for cracking petroleum oils.—Standard Oil Development Co. Sept. 29, 1937. 15749/38.

ELECTROLYTICALLY REFINING COPPER and the alloys thereof and electrolytically treating metals plated with copper and the alloys thereof.—Siemens and Halske, A.-G. Oct. 1, 1937. 19569/38.

PRODUCING PIG IRON, more particularly Thomas pig iron.—A. Thyssen-Hutte, A.-G. Oct. 2, 1937. 21859/38.

PRODUCTION OF OLEFINE POLYMERS.—Standard Oil Development Co. Oct. 2, 1937. 23049/38.

POLYMERS OF METHACRYLIC ACID METHYL ESTER.—Rohm and Haas, A.-G. Sept. 29, 1937. 23743/38.

PROCESS OF HYDROCARBON OIL CONVERSION.—Naamlooze Vennootschap Nieuwe Octrooi Maatschappij. Sept. 28, 1937. 23867/38.

MANUFACTURE OF WASHING, cleansing, bleaching, and rinsing-agents.—Henkel and Cie, Ges. Oct. 2, 1937. 24954/38.

POLYMERISATION OF UNSATURATED GASEOUS HYDROCARBONS.—Standard Oil Development Co. Oct. 1, 1937. 25046/38.

SULPHO-CARBOXYLIC ESTERS of alcohols of higher molecular weight and process of producing same.—F. J. Cahn, and M. B. Katzman. Sept. 29, 1937. 26725/38.

MAGNESIUM ALLOYS.—G. Von. Giesche's Erben. Sept. 29, 1937. 27010/38.

PRODUCTION OF POLYVINYL RESINS.—Kodak, Ltd. Oct. 2, 1937. 27555/38.

MANUFACTURE OF CELLULOSE DERIVATIVES.—British Celanese, Ltd. Sept. 29, 1937. 27643/38.

PROCESS FOR THE MANUFACTURE OF DUROHYDRO-QUINONE-MONOPHYTYL ETHER.—F. Hoffman-La Roche and Co., A.-G. Oct. 1, 1937. 28184/38.

MANUFACTURE OF SYNTHETIC RUBBER-LIKE MATERIALS.—I. G. Farbenindustrie. Sept. 29, 1937. 28222/38.

MANUFACTURE OF POLYMERIC PRODUCTS of rubber-like character. I. G. Farbenindustrie. Sept. 30, 1937. 28223/38.

PRODUCTION OF DYESTUFFS on the fibre.—I. G. Farbenindustrie. Oct. 1, 1937. 28245/38.

PRODUCTION OF FAST FINISHES and dyeings on textile material. I. G. Farbenindustrie. Sept. 29, 1937. 28387/38.

PRODUCTION OF β-ARALKYLAMINES.—T. H. Temmler (trading as Temmler-Werke Vereinigte Chemische Fabriken H. Temmler). Oct. 2, 1937. 28581/38.

MANUFACTURE OF COMPOUNDS OF THE CYCLOPENTANOPOLYHYDROPHENANTHRENE SERIES.—I. G. Farbenindustrie. Oct. 2, 1937. 28668/38.

PRODUCTION OF TITANIUM DIOXIDE PIGMENTS.—E. I. du Pont de Nemours and Co. Oct. 2, 1937. 28518/38.

MANUFACTURE OF RESINS.—Standard Oil Development Co. Oct. 6, 1937. 15872/38.

SULPHURISED OILS.—Standard Oil Development Co. Oct. 8, 1937. 20596/38.

PRODUCTION OF OLEFINE POLYMERS.—Standard Oil Development Co. Oct. 6, 1937. 23050/38.

PRODUCTION OF POLYSTYRENE BODIES.—Dow Chemical Co. Oct. 6, 1937. 26824/38.

MANUFACTURE OF DISAZO-DYESTUFFS.—I. G. Farbenindustrie. Oct. 7, 1937. 27408/38.

MANUFACTURE OF AZO-DYESTUFFS.—I. G. Farbenindustrie. Oct. 8, 1937. 27409/38.

MANUFACTURE OF MELAMINE.—Soc. of Chemical Industry in Basle. Oct. 5, 1937. 27636/38.

PROCESS FOR THE MANUFACTURE OF QUINOLINE COMPOUNDS.—I. G. Farbenindustrie. Oct. 7, 1937. 27673/38.

PRODUCTION OF IMPERMEABLE MATERIAL and compositions for use therein.—W. J. H. Hinrichs. Oct. 6, 1937. 28524/38.

PROCESS FOR THE PREPARATION OF CARBON TETRACHLORIDE.—Consortium Fur Electro-Chemische Industrie Ges. Oct. 4, 1937. 28739/38.

ELECTROLYTIC OXIDATION OF ALUMINIUM and other light metals. H. Papst. Oct. 4, 1937. 28824/38.

PROCESS FOR THE PREPARATION OF ALLOYS of aluminium and nickel.—Metallurgica Bresciana Gia Tempini. Oct. 5, 1937. 28896/38.

MANUFACTURE OF HYDROXY-KETONES of the cyclopentanopolyhydrophenanthrene series.—Schering, A.-G. Oct. 5, 1937. 28929/38.

PROCESS FOR THE MANUFACTURE OF UNSATURATED COMPOUNDS of the cyclopentanopolyhydrophenanthrene series.—Schering, A.-G. Oct. 5, 1937. 28933/38.

PROCESS FOR THE MANUFACTURE AND PRODUCTION OF OXIDATION PRODUCTS of high molecular aliphatic hydrocarbons.—I. G. Farbenindustrie. Oct. 7, 1937. 28989/38.

PROCESS FOR CONCENTRATING THE BITUMEN CONTENT OF OIL SHALES by flotation.—Visura Treuhand-Ges. Oct. 9, 1937. 29081/38.

PLASTICISING OF RUBBER.—E. I. du Pont de Nemours and Co. Oct. 8, 1937. 29323/38.

DETERGENTS.—Aktiebolaget Purnol. Oct. 9, 1937. 29340/38.

MANUFACTURE OF CARBOXYLIC ACID ANHYDRIDES.—Deutsche Gold- und Silber-Scheideanstalt Vorm. Roessler. Oct. 9, 1937. 29344/38.

Specifications Accepted with Date of Application

METHOD OF REDUCING THE AMOUNT OF MANGANESE lost in the production of Thomas steel.—O. Evans (Dortmund-Hoerder Hutten-Vereen, A.-G.). June 28, 1937. (Convention date not granted.). 503,131.

MANUFACTURE AND PRODUCTION OF CARBON COMPOUNDS poor in hydrogen.—G. W. Johnson (I. G. Farbenindustrie.) July 27, 1937. 502,961.

PURIFICATION OF WATER for consumption and of waste water.—Eau et Assainissement, Anciens Etablissements C. Gibault. April 19, 1937. 502,962.

PRODUCTION OF FAST DYEINGS or prints.—W. W. Groves (I. G. Farbenindustrie.) Aug. 24, 1937. 503,134.

PRODUCING SULPHONATED PRODUCTS.—R. Kimbara. Aug. 24, 1936. 502,964.

MANUFACTURE OF SEMI-PYROPHORIC COMPOUNDS.—O. F. Wyss. Aug. 25, 1936. 502,965.

LAMINATED SAFETY GLASS and plastic materials therefor.—Libbey-Owens-Ford Glass Co. Dec. 31, 1936. 502,904.

LAMINATED SAFETY GLASS.—Libbey-Owens-Ford Glass Co. May 3, 1937. 502,905.

POLYVINYL ACETAL RESIN PLASTIC MATERIALS.—Libbey-Owens-Ford Glass Co. May 14, 1937. 502,906.

METHOD OF STABILISING SOLUTIONS sensitive to heat.—W. W. Groves (I. G. Farbenindustrie.) Sept. 27, 1937. 503,080.

PRODUCING SHRINKAGE EFFECTS IN TEXTILES.—I. G. Farbenindustrie. Sept. 30, 1936. 502,907.

CELLULOSE ETHERS and the product produced.—Cellulose Holdings, Ltd. Oct. 15, 1936. 503,090.

RECOVERY OF PHENOLS from resins of phenols and aldehydes.—G. W. Johnson (I. G. Farbenindustrie.) Sept. 30, 1937. 503,200.

MANUFACTURE OF CHLORINATED HYDROCARBONS.—F. W. Kirkbride, and Imperial Chemical Industries, Ltd. Sept. 30, 1937. 503,205.

PRODUCING LUBRICATING-OILS.—Ruhrchemie, A.-G. Oct. 1, 1936. 503,206.

PRODUCTION OF ELECTRODEPOSITS OF COPPER.—B. F. Schmeig. Oct. 4, 1937. 503,095.

PREPARATION OF COPPER PHTHALOCYANINES.—Montecatini Soc. Generale Per L'Industria Mineraria Ed Agricola. July 3, 1937. 503,029.

OBTAINING ORGANIC COMPOUNDS from the acid wastes from refining of mineral oils.—J. Winkler, W. J. Piotrowski, and Galicysjskie Towarzystwo Naftowe Galicja Soc. Anon. Dec. 2, 1936. 503,108.

TREATMENT OF BERYLLIUM ORES.—D. Gardner. Feb. 18, 1938. 502,987.

PRODUCTION OF LEAD TITANATE PIGMENTS.—Titan Co., Inc. Feb. 23, 1937. 502,988.

PURIFYING BEET-SUGAR JUICE.—B. Zimmerman. April 14, 1938. 503,121.

CATALYST FOR OXIDATION OF OLEFINES.—U.S. Industrial Alcohol Co. May 15, 1937. 503,052.

RECOVERY OF ZINC from zinciferous material in shaft or the like furnaces.—Metallges, A.-G. June 12, 1937. 502,993.

DYEING OF CELLULOSIC MATERIAL.—J. G. Evans, H. A. Piggott, R. J. W. Reynolds, J. D. Rose, E. E. Walker, and Imperial Chemical Industries, Ltd. June 30, 1937. 503,168.

PROCESS FOR THE MANUFACTURE OF LUBRICANTS.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij, and J. G. Fife. Aug. 26, 1937. 503,177.

PRODUCTION OF HYDROCARBON GASES by hydrogenation of carbonaceous materials.—Institution of Gas Engineers and F. J. Dent. Oct. 12, 1937. 503,183.

FIREPROOFING OF MATERIALS consisting at least partially of rubber.—T. Wituski. June 15, 1938. 503,186.

ZINC ALLOYS.—G. Von. Giesche's Erben. Oct. 23, 1937. (Addition to 483,198.) 503,068.

ELECTRODEPOSITION OF METALS on alloys containing chromium. Mond Nickel Co., Ltd. Dec. 1, 1937. 503,008.

PURIFICATION OF WATER for consumption of waste water.—Eau et Assainissement, Anciens Etablissements C. Gibault, and P. E. Chidaine. Aug. 23, 1937. 503,011.

PREPARATION OF PECTIN.—Sardik, Inc., and P. B. Myers. July 5, 1937. 503,403.

REFINING OF LIGHT HYDROCARBON OIL.—Kohle und Eisenforschung Ges. Feb. 24, 1937. 503,404.

UTILISATION OF GASEOUS MIXTURES which contain hydrogen halide, hydrocarbons, and/or halogenated hydrocarbons.—G. W. Johnson (I. G. Farbenindustrie.) Aug. 26, 1937. 503,220.

MANUFACTURE OF STABLE MIXTURES containing laevo-ascorbic acid or other endiols.—Naamlooze Vennootschap Industrieele Maatschappij Voorheen Noury and Van Der Lande. Oct. 1, 1936. 503,476.

COMPOUNDS OF THE THIAZOLIDINE SERIES.—Soc. of Chemical Industry in Basle. Oct. 2, 1936. (Sample furnished.) 503,478.

MANUFACTURE OF CALCIUM CYANAMIDE.—A.-G. Fur Stickstoff-Dunger. Oct. 2, 1936. 503,336.

MANUFACTURE OF NONACARBOCYANINE DYESTUFFS.—I. G. Farbenindustrie. Oct. 29, 1936. 503,337.

MANUFACTURE OF INSECTICIDAL COMPOSITIONS.—Imperial Chemical Industries, Ltd. Oct. 3, 1936. 503,490.

COPPER-BASE ALLOYS.—Imperial Chemical Industries, Ltd. (American Brass Co.). Oct. 5, 1937. 503,423.

CONDENSATION OF MAGNESIUM VAPOURS.—Magnesium Metal Corporation, Ltd. (American Magnesium Metals Corporation). Oct. 28, 1937. 503,245.

MANUFACTURE AND PRODUCTION OF HYDROCARBONS or their derivatives from carbon monoxide and hydrogen.—I. G. Farbenindustrie. Nov. 4, 1936. 503,247.

PRODUCTION OF PAINTS.—W. J. Tennant (Henkel and Cie, Ges.). Nov. 25, 1937. 503,349.

SEPARATION OF AMMONIA and sulphuretted hydrogen.—J. Guillissen, and Union Chimique Belge Soc. Anon. Dec. 6, 1937. 503,256.

METHOD FOR THE CONTINUOUS PREPARATION OF SUPERPHOSPHATES. J. G. Gaunt (Compagnie Nationale de Matieres Colorantes et Manufactures de Produits Chimiques du Nord Reunies, Etablissements Kuhlmann). Dec. 11, 1937. 503,352.

PREPARING DERIVATIVES OF AMINOBENZENE SULPHAMIDES.—Chinoin Gyogyszer es Vegyeszeti Termekek Gyara R. T. (Dr. Kereszty and Dr. Wolf). Jan. 22, 1938. 503,271.

PRODUCTION OF COLOURED DESIGNS on the surface of aluminium or aluminium alloys.—L. T. Gmach. Oct. 11, 1937. 503,451.

PRODUCTION OF MAGNESIA.—Dynamidon-Werk Engelhorn and Co., Ges. June 14, 1937. 503,291.

PREPARATION OF ALKALI METAL PEROXIDES.—Deutsche Gold- und Silber-Scheideanstalt Vorm. Roessler. July 8, 1937. 503,382.

PRODUCTION OF METALLIC MAGNESIUM.—Metallges, A.-G. March 30, 1938. 503,296.

HARD METAL ALLOYS.—H. Petersson. July 6, 1938. 503,397.

MANUFACTURE OF INSECTICIDAL COMPOSITIONS.—Imperial Chemical Industries, Ltd. Oct. 3, 1936. 503,507.

ARTIFICIAL DISPERSIONS OF RUBBER.—Dispersions Process, Inc. Jan. 13, 1938. 503,399.

STABILISING SOLUTIONS OF IODINE AND OIL.—V. Klopfer. Jan. 6, 1939. 503,313.

MANUFACTURE OF N-SUBSTITUTED AMINO PHENOLS.—Kodak, Ltd. April 3, 1937. 503,400.

Forthcoming Events

London.

April 25.—British Chemical and Dyestuffs Traders' Association, Ltd. Annual General Meeting. 3 p.m. Savoy Hotel, W.C.2.

April 28.—Chemical Engineering Group. Annual dinner, Waldorf Hotel, W.C.2.

May 1.—Society of Chemical Industry. Annual general meeting. Burlington House, Piccadilly, W.1. 8 p.m. Dr. A. C. Thayson, "Micro-Organisms in Industry."

May 2.—University of London. University College, Gower Street, W.C.1. 5 p.m. Professor E. J. Bigwood, "Chemical Reactions between Proteins and Electrolytes."

Birmingham.

May 2.—Electrodepositors' Technical Society. James Watt Memorial Institute, Great Charles Street. 7.30 p.m. L. Wright, "Energy Dissipation in Plating Solutions."

Manchester.

April 28.—Society of Chemical Industry. Constitutional Club, St. Ann Street. 7 p.m. Annual General Meeting.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

South Africa.—H.M. Trade Commissioner at Johannesburg reports that the Johannesburg City Council is calling for tenders (Contract No. 245) for the supply and delivery in twelve monthly instalments, commencing July 1, 1939, of approximately 6,000 tons of bitumen in varying grades. Tenders, endorsed "Contract No. 245, Bitumen," should be addressed to the Town Clerk, Municipal Offices, Johannesburg, South Africa, by whom they will be received up to noon on Wednesday, May 17, 1939. (Ref. T. 21177/39).

Belgium.—A well-established firm of agents at Brussels wishes to obtain the representation, buying on their own account, of United Kingdom manufacturers of pharmaceutical specialities; druggists' sundries for Belgium and the Grand Duchy of Luxembourg, and also possibly the Belgian Congo. (Ref. No. 300.)

Holland.—A well-established agent at Rotterdam wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of china clay; raw materials for the paint, chemical and pharmaceutical industries. (Ref. No. 302.)

Holland.—An agent established at Enschede wishes to obtain the representation, on a commission basis and for his own account, of United Kingdom manufacturers of pharmaceutical products (particularly vitamins and hormones). (Ref. No. 282.)

British West Indies.—A firm of agents established at Kingston, Jamaica, wishes to obtain the representation, mainly on a commission basis of United Kingdom manufacturers of pharmaceutical preparations. (Ref. No. 295.)

Egypt.—The Commercial Secretary to His Majesty's Embassy at Cairo reports that the Egyptian Ministry of the Interior is calling for tenders for the supply and delivery as and when required during the year ending April 30, 1940, of quantities of photographic materials including: perforated film, plates, etc. Tenders endorsed "Tender for the supply of photographic material" should be addressed to the Director, Budget and Equipment Department, Ministry of the Interior, Cairo, Egypt, by whom they will be received up to noon on June 1, 1939.

Egypt.—The Commercial Secretary to His Majesty's Embassy in Egypt reports that the Department of Survey and Mines, Giza (Orman), is calling for tenders for the supply and delivery of quantities of sensitive paper for photostat machines, developing powder and acid fixing powder. Tenders endorsed "Tender for Sensitive Paper and Chemicals" should be addressed to the Director-General, Department of Survey and Mines, Giza (Orman), Egypt, by whom they will be received up to noon on Saturday, May 20, 1939. Tenders should be accompanied by a free sample roll of paper (350 feet) and chemicals sufficient for testing same.

Company News

A. Boake, Roberts and Co., Ltd., have declared an interim dividend of 1¼ per cent., tax free (1 per cent. declared in May, 1938.)

Van Den Bergh's En Jurgens' Fabrieken N.V. have declared a half-yearly dividend on 5½ per cent. cumulative preference shares payable May 1.

The British Enka Artificial Silk Co., Ltd., at an extraordinary general meeting on Monday, decided to change their name to British Enka, Ltd.

Crosse & Blackwell.—Preliminary figures for 1938 show that net profits were £73,355, against £91,389 for 1937. Ordinary dividend unchanged at 2½ per cent.

Wm. Butler & Co. (Bristol), tar distillers, announce net profit for 1938 of £25,471 (£24,730); dividend 7½ per cent. (same); forward, £13,612 (£13,197).

Murex, Ltd., are maintaining their interim dividend for 1938-1939 at 7½ per cent. For 1937-38, a final dividend of 10 per cent., plus a bonus of 2½ per cent. brought the year's total to 20 per cent.

Huntington, Heberlein and Co., Ltd., engineers, contractors and chemists, etc., have increased their nominal capital by the addition of £10,000, in £1 ordinary shares, beyond the registered capital of £20,000.

Bryant and May, Ltd., have announced that net profits for the year ended March 31, amounted to £562,365 (£562,168). After again allocating £100,000 to reserve, the carry-forward amounts to £132,617 (£140,952).

Ault and Wiborg, Ltd., printing ink manufacturers, report a profit of £76,130 (£75,928). A final dividend of 10¾ per cent. actual, less tax, has been declared on the ordinary shares, making 14 per cent., against a total distribution of 15 per cent. last year.

Eno Proprietaries, Ltd., which is now controlled by Beechams Pills, Ltd., is reducing its dividend for 1938 by 4 per cent., to 7 per cent., less tax. The accounts show a fall in income of £45,220, to £146,992. Income-tax, N.D.C., and overseas dividend tax absorbs £44,885 (£50,153), leaving net profits of £95,446 (£134,693).

Goodlass Wall and Lead Industries, Ltd., have announced a dividend of 6 per cent. actual, plus a bonus of 1 per cent. actual, both less tax, on the ordinary shares for 1938 (the same). Net profit for the year, subject to audit, after deduction of income-tax, N.D.C., and directors' fees, amounts to £185,040, compared wih £191,511 last year.

The General Refractories group report a fall in consolidated trading profits for 1938 of from £166,436 to £100,087. After deducting interest, £19,487 (£14,953), depreciation £40,418 (£40,960), tax and N.D.C. £17,856 (£13,535), the balance of net profits attributable to the parent company is £15,138 (£81,600). The directors have not recommended a dividend, and £25,164 is carried forward compared with £10,075 brought in.

Chemical and Allied Stocks and Shares

MORE HOPEFULNESS in regard to the political outlook induced a better tendency in the industrial section of the Stock Exchange, but the volume of business was very small, particularly in view of the general disposition to await the Budget statement. Shares of companies associated with the chemical and kindred trades moved irregularly, but in most cases they are little changed on balance for the week.

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Imperial Chemical made the slightly higher price of 28s. 4½d. awaiting the full results for the past year's working, and the preference units at 29s. 1½d. were also little changed. B. Laporte were inactive, pending declaration of the final dividend, but continued to be quoted at 85s. Fison Packard and Prentice were steady at 37s. 6d. British Oxygen came in for demand, and as compared with a week ago have risen from 70s. to 73s. 1½d. Later in the week Dunlop Rubber, Turner and Newall and other widely held shares also became a steadier market. British Aluminium made the slightly higher price of 54s. 3d., and Birmid Industries shares also tended to attract attention.

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Distillers ordinary units reacted sharply at one time, but rallied subsequently, and are 88s. 6d. at the time of writing, compared with 88s. 9d. a week ago, attention being drawn to the importance of the industrial alcohol side of the business should war conditions develop. Lever and Unilever show a loss of 1s. on balance and are around 32s. at the time of writing, but have been steadier than was the case a week ago. United Molasses improved to 22s. 1½d., but were inclined to fluctuate, pending declaration of the interim dividend.

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Boots Drug were virtually unchanged at 40s. 7½d., sentiment having continued to benefit from hopes that the forthcoming preliminary results may announce a scrip bonus. Beechams Pills deferred shares were lower following publication of the results of Eno Proprietaries (in which Beechams Pills now has a controlling interest) but the price recovered later and at 6s. 7½d. is a few pence better on the week. Hopes that dividend payments may be maintained kept a steady tendency in Sangers and Timothy Whites shares, which are 20s. 1½d. and 23s. 10½d. respectively. British Drug Houses were unchanged at 21s. 3d. xd., and William Blythe 3s. shares were maintained at 5s. 9d.

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Courtaulds and various other textile shares were inclined to make slightly better prices. British Celanese issues were again steadier, pending the decision as to a payment on the first preference shares. Associated Cement regained an earlier decline, and at 68s. 1½d. are unchanged on balance. British Plaster Board at 26s. are within 9d. of the price ruling a week ago. Imperial Smelting have gone back from 9s. 9d. to 8s. 9d., and Borax Consolidated deferred shares were 21s. 3d., compared with 22s. Goodlass Wall were little changed at 9s. 3d. on the past year's results.

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Babcock and Wilcox lost a few pence to 39s. 6d. pending declaration of the dividend, but Colvilles improved on the good impression created by the past year's results. Dorman Long were well maintained at 28s., but rather lower prices ruled for Tube Investments and Stewarts and Lloyds. Pinchin Johnson were slightly lower at 23s.

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Oil shares were inclined to improve, partly owing to encouraging market estimates in regard to the dividend announcements which are due next month from the Anglo-Iranian, Burmah Oil, Trinidad Leaseholds and V.O.C. companies.

Weekly Prices of British Chemical Products

BUSINESS in chemical products has followed a very even trend during the past week, the movement being about the average for the period. Deliveries under existing contracts have been taken up in satisfactory quantities and quite a good inquiry for new business of a long term nature has been put through. A fair seasonal interest has been displayed in Acetic, Tartaric and Citric Acids and business in Solvents and Fertilisers has been on a fair average scale. Values remain steady at recent levels and no important price changes fall to be recorded for general chemicals, rubber chemicals and wood distillation products. In the Coal Tar market trade continues to show a slight improvement. Values, if anything, are inclined to be a little harder, particularly for Toluol and Xylol, and both these items continue to be a bright feature.

MANCHESTER.—Although a lack of confidence in the general outlook tends to limit fresh business, there is a fair movement of supplies of the leading heavy chemicals against contracts and the position in this respect, so far as the Manchester district is concerned, is now back to about where it was before the holidays, with a number of traders reporting a somewhat better movement of textile chemicals both in the Lancashire and Yorkshire areas. The price position as a whole is steady and comparatively little indication of easiness is in evidence. Activity in the by-products market locally is largely concerned with the light materials, values of which are mostly maintained.

Price Changes

Falls: Copper Sulphate (Manchester)

Rises: Pitch (Manchester)

GLASGOW.—There has been a steady day-to-day demand for chemicals for home trade during the week, and rather more inquiry for export. Prices generally continue quite firm at about previous figures, with no quotable changes to report.

General Chemicals

ACETONE.—£39 to £43 per ton, according to quantity.

ACETIC ACID.—Tech, 80%, £30 5s. per ton; pure 80%, £32 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 5s. 0d. per ton d/d Lancs. GLASGOW: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 1s. to 1s. 1d. per lb. d/d in cylinders. SCOTLAND: 10½d. to 1s. 0½d., containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE.—Grey, £17 10s. per ton, d/d U.K. Fine white, 98%, £16 per ton, d/d U.K.

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM DICHROMATE.—8¼d. per lb. d/d U.K.

ANTIMONY OXIDE.—£68 per ton.

ARSENIC.—Continental material £11 per ton c.i.f., U.K. ports; Cornish White, £12 5s. to £12 10s. per ton f.o.r., mines, according to quantity. MANCHESTER: White powdered Cornish, £15 10s. per ton, ex store.

BARIUM CHLORIDE.—£11 10s. to £12 10s. per ton in casks ex store. GLASGOW: £12 per ton.

BLEACHING POWDER.—Spot, 35/37%, £9 5s. per ton in casks, special terms for contract. SCOTLAND: £9 5s. per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16, crystal, £17; powdered, £17 10s. per ton in 1-cwt. bags, carriage paid.

BORIC ACID.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

CALCIUM BISULPHITE.—£6 10s. per ton f.o.r. London.

CHARCOAL, LUMP.—£6 to £6 10s. per ton, ex wharf. Granulated, £7 to £9 per ton according to grade and locality.

CHLORINE, LIQUID.—£18 15s. per ton, seller's tank wagons, carriage paid to buyer's sidings; £19 5s. per ton, d/d in 16/17 cwt. drums (3-drum lots); £19 10s. per ton d/d in 10-cwt. drums (4-drum lots); 4⅜d. per lb. d/d station in single 70-lb. cylinders.

CHROMETAN.—Crystals, 2⅝d. per lb.; liquor, £13 per ton d/d station in drums. GLASGOW: Crystals, 2⅝d. per lb.

CHROMIC ACID.—9d. per lb., less 2½%; d/d U.K.

CHROMIC OXIDE.—11½d. per lb.; d/d U.K.

CITRIC ACID.—1s. 0½d. per lb. MANCHESTER: 1s. 0½d. SCOTLAND: B.P. crystals, 1s. 0½d. per lb.; less 5%, ex store.

COPPER SULPHATE.—£18 5s. per ton, less 2% in casks. MANCHESTER: £18 12s. 6d. per ton f.o.b. SCOTLAND: £19 10s. per ton, less 5%, Liverpool in casks.

CREAM OF TARTAR.—100%, 92s. per cwt., less 2½%. GLASGOW: 99%, £4 12s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£20-£22 per ton.

FORMIC ACID.—85%, in carboys, ton lots, £42 to £47 per ton.

GLYCERINE.—Chemically pure, double distilled, 1.260 s.g., in tins, £3 10s. to £4 10s. per cwt. according to quantity; in drums, £3 2s. 6d. to £3 16s. 0d. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

HYDROCHLORIC ACID.—Spot, 5s. 6d. to 8s. carboy d/d according to purity, strength and locality.

IODINE.—Resublimed B.P., 6s. 9d. per lb. in 7 lb. lots.

LACTIC ACID.—(Not less than ton lots). Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50%, by vol., £41. One-ton lots ex works, barrels free.

LEAD ACETATE.—LONDON: White, £31 10s. ton lots; brown, £35. GLASGOW: White crystals, £29 10s.; brown, £1 per ton less. MANCHESTER: White, £31; brown, £30.

LEAD, NITRATE.—£32 per ton for 1-ton lots.

LEAD, RED.—£30 15s. 0d. 10 cwt. to 1 ton, less 2½% carriage paid. SCOTLAND: £30 per ton, less 2¼% carriage paid for 2-ton lots.

LITHARGE.—SCOTLAND: Ground, £30 per ton, less 2½ %, carriage paid for 2-ton lots.

MAGNESITE.—Calcined, in bags, ex works, about £8 per ton. SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—Solid (ex wharf) £5 10s. per ton. SCOTLAND: £7 5s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 10s. per ton, ex wharf.

MERCURY PRODUCTS.—Ammoniated B.P. (white precip.), lump, 6s. 8d. per lb.; powder B.P., 6s. 10d.; bichloride B.P. (corros. sub.), 5s. 11d.; powder B.P. 5s. 7d.; chloride B.P. (calomel), 6s. 8d.; red oxide cryst. (red precip.), 7s. 9d.; levig, 7s.; yellow oxide B.P. 7s. 1d.; persulphate white B.P.C., 6s. 10d.; sulphide black (hyd. sulph. cum. sulph. 50%), 6s. 9d. For quantities under 112 lb., 1d. extra; under 28 lb., 5d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NITRIC ACID.—Spot, £25 to £30 per ton according to strength, quantity and destination.

OXALIC ACID.—£48 15s. to £57 10s. per ton, according to packages and position. GLASGOW: £2 9s. per cwt. in casks. MANCHESTER: £49 to £55 per ton ex store.

PARAFFIN WAX.—SCOTLAND: 3¾d. per lb.

POTASH, CAUSTIC.—Solid, £33 5s. to £38 per ton according to quantity, ex store; broken, £40 per ton. MANCHESTER: £38.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. GLASGOW: 4½d. per lb. MANCHESTER: £37 per ton.

POTASSIUM DICHROMATE.—5½d. per lb. carriage paid. SCOTLAND: 5¼d. per lb., net, carriage paid.

POTASSIUM IODIDE.—B.P. 6s. 3d. per lb. in 7 lb. lots.

POTASSIUM NITRATE.—Small granular crystals, £24 to £27 per ton ex store, according to quantity. GLASGOW: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9½d. to 10½d. per lb. SCOTLAND: B.P. Crystals, 10½d. MANCHESTER: B.P. 9½d. to 11½d.

POTASSIUM PRUSSIATE.—5½d. to 6d. per lb. SCOTLAND: 6¾d. net, in casks, ex store. MANCHESTER: Yellow, 6d. to 6½d.

PRUSSIATE OF POTASH CRYSTALS.—In casks, 6¾d. per lb. net, ex store

SALAMMONIAC.—Firsts lump, spot, £42 17s. 6d. per ton, d/d address in barrels. Dog-tooth crystals, £35 per ton; fine white crystals, £18 per ton, in casks, ex store. GLASGOW: Large crystals, in casks, £37 10s.

SALT CAKE.—Unground, spot, £3 8s. 6d. per ton.

SODA ASH.—Light 98/100%, £5 17s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £13 10s. per ton d/d station. SCOTLAND: Powdered 98/99%, £18 10s. in drums, £19 5s. in casks, Solid 76/77° £15 12s. 6d. in drums; 70/73%, £15 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts, 10s. per ton less.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£19-£20 per ton carriage paid North. GLASGOW: £18 10s. per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags in 1-ton lots. GLASGOW: £13 5s. per ton in 1 cwt. kegs, £11 5s. per ton in 2-cwt. bags. MANCHESTER: £10 15s.

SODIUM BISULPHITE POWDER.—60/62%, £12 10s. to £14 per ton d/d in 2-ton lots for home trade.

SODIUM CARBONATE MONOHYDRATE.—£20 per ton d/d in minimum ton lots in 2 cwt. free bags.

SODIUM CHLORATE.—£27 10s. to £32 per ton. GLASGOW: £1 11s. per cwt., minimum 3 cwt. lots.

SODIUM DICHROMATE.—Crystals cake and powder 4½d. per lb. net d/d U.K. with rebates for contracts.

SODIUM CHROMATE.—4½d. per lb. d/d U.K.
4d. per lb. GLASGOW: 4½d. net, carriage paid.

SODIUM HYPOSULPHITE.—Pea crystals, £15 5s. per ton for 2-ton lots; commercial, £11 5s. per ton. MANCHESTER: Commercial, £11; photographic, £15 10s.

SODIUM METASILICATE.—£14 5s. per ton, d/d U.K. in cwt. bags.

SODIUM NITRATE.—Refined, £8 per ton for 6-ton lots d/d. GLASGOW: £1 12s. 0d. per cwt. in 1-cwt. kegs, net, ex store.

SODIUM NITRITE.—£18 5s. per ton for ton lots.

SODIUM PERBORATE.—10%, £4 per cwt. d/d in 1-cwt. drums.

SODIUM PHOSPHATE.—Di-sodium, £12 per ton delivered for ton lots. Tri-sodium, £16 10s. per ton delivered per ton lots.

SODIUM PRUSSIATE.—4d. per lb. for ton lots. GLASGOW: 4d. MANCHESTER: 4½d. to 5d.

SODIUM SILICATE.—£8 2s. 6d. per ton.

SODIUM SULPHATE (GLAUBER SALTS).—£3 per ton d/d.

SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 to £3 10s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 10s.

SODIUM SULPHIDE.—Solid 60/62%, Spot, £11 15s. per ton d/d in drums; crystals, 30/32%, £9 per ton d/d in casks. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 10s.

SODIUM SULPHITE.—Pea crystals, spot, £14 10s. per ton d/d station in kegs.

SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.

SULPHURIC ACID.—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.

TARTARIC ACID.—1s. 1½d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 1s. 1½d. per lb. GLASGOW: 1s. 1½d. per lb., 5%, ex store.

ZINC SULPHATE.—Tech., £11 10s. f.o.r., in 2 cwt. bags.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 7d. to 1s. 2d. per lb., according to quality. Crimson, 1s. 6d. to 1s. 7½d. per lb.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARYTES.—£6 to £6 10s. per ton, according to quality.

CADMIUM SULPHIDE.—3s. 0d. to 3s. 3d. per lb.

CARBON BLACK.—3⅝d. to 4 1/16d. per lb., ex store.

CARBON DISULPHIDE.—£31 to £33 per ton, according to quantity, drums extra.

CARBON TETRACHLORIDE.—£41 to £46 per ton, according to quantity, drums extra.

CHROMIUM OXIDE.—Green, 10½d. to 11½d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

INDIA-RUBBER SUBSTITUTES.—White, 4½d. to 5d. per lb.; dark 3⅝d. to 4⅜d. per lb.

LAMP BLACK.—£24 to £26 per ton del., according to quantity. Vegetable black, £35 per ton upwards.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE.—Spot, 30%, £16 10s. per ton, 2-ton lots d/d in bags.

SULPHUR.—£9 to £9 5s. per ton. SULPHUR PRECIP. B.P., £55 to £60 per ton. SULPHUR PRECIP. COMM., £50 to £55 per ton.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quantity.

VERMILION.—Pale, or deep, 5s. per lb., 1-cwt. lots.

ZINC SULPHIDE.—£58 to £60 per ton in casks ex store, smaller quantities up to 1s. per lb.

Nitrogen Fertilisers

AMMONIUM SULPHATE.—The following prices have been announced for neutral quality basis 20.6% nitrogen, in 6-ton lots delivered farmer's nearest station up to June 30, 1939; November, £7 8s.; December, £7 9s. 6d.; January, 1939; £7 11s.; February, £7 12s. 6d.; March/June, £7 14s.

CALCIUM CYANAMIDE.—The following prices are for delivery in 5-ton lots, carriage paid to any railway station in Great Britain up to June 30, 1939; November, £7 12s. 6d.; December, £7 13s. 9d.; January, 1939, £7 15s.; February, £7 16s. 3d.; March, £7 17s. 6d.; April/June, £7 18s. 9d.

NITRO CHALK.—£7 10s. 6d. per ton up to June 30, 1939.

SODIUM NITRATE.—£8 per ton for delivery up to June 30, 1939.

CONCENTRATED COMPLETE FERTILISERS.—£11 4s. to £11 13s. per ton in 6-ton lots to farmer's nearest station.

AMMONIUM PHOSPHATE FERTILISERS.—£10 19s. 6d. to £14 16s. 6d. per ton in 6-ton lots to farmer's nearest station.

Coal Tar Products

BENZOL.—At works, crude, 9½d. to 10d. per gal.; standard motor, 1s. 3½d. to 1s. 4d.; 90%, 1s. 4½d. to 1s. 5d., pure 1s. 8½d. to 1s. 9d. GLASGOW: Crude, 10d. to 10½d. per gal.; motor, 1s. 4d. to 1s. 4½d. MANCHESTER: Pure, 1s. 8d. to 1s. 8½d. per gal.; crude 11d. to 11½d. per gal.

CARBOLIC ACID.—Crystals, 6⅝d. to 7⅝d. per lb., small quantities would be dearer; Crude, 60's, 1s. 7½d. to 1s. 10d.; dehydrated, 2s. 6d. per gal., according to specification; Pale, 99/100%, per lb. f.o.b. in drums; crude, 2s. 1d. per gal.

CREOSOTE.—Home trade, 3½d. to 4d. per gal., f.o.r., makers' works; exports 6d. to 6¼d. per gal., according to grade. MANCHESTER: 3d. to 3⅜d. GLASGOW: B.S.I. Specification, 6d. to 6¼d. per gal.; washed oil, 5d. to 5¼d.; lower sp. gr. oils, 5⅜d. to 6¼d.

CRESYLIC ACID.—97/99%, 1s. 4d. to 1s. 7d.; 99/100%, 1s. 9d. to 2s. 6d. per gal., according to specifications; Pale, 99/100%, 1s. 6d. to 1s. 8d.; Dark, 95%, 1s. 2d. to 1s. 4d. per gal. GLASGOW: Pale, 99/100%, 5s. to 5s. 6d. per gal.; pale, 97/99%, 4s. 6d. to 4s. 10d., dark, 97/99%, 4s. 3d. to 4s. 6d.; high boiling acids, 2s. to 2s. 6d. American specification, 3s. 9d. to 4s. MANCHESTER: Pale, 99/100%, 1s. 9d.

NAPHTHA.—Solvent, 90/160, 1s. 6d. to 1s. 7d. per gal.; solvent, 95/160%, 1s. 7d. to 1s. 8d., naked at works; heavy 90/190%, 1s. 1½d. to 1s. 3d. per gal., naked at works, according to quantity. MANCHESTER: 90/160%, 1s. 5d. to 1s. 7d. per gal. GLASGOW: Crude, 6½d. to 7½d. per gal.; 90%, 160, 1s. 5d. to 1s. 6d., 90%, 190, 1s. 1d. to 1s. 3d.

NAPHTHALENE.—Crude, whizzed or hot pressed, £4 10s. to £5 10s. per ton; purified crystals, £9 10s. per ton in 2-cwt. bags. LONDON: Fire lighter quality, £3 to £4 10s. per ton. GLASGOW: Fire lighter, crude, £6 to £7 per ton (bags free). MANCHESTER: Refined, £10 10s. to £11 10s. per ton f.o.b.

PITCH.—Medium, soft, 27s. 6d. per ton, f.o.b. MANCHESTER: 26s. f.o.b., East Coast. GLASGOW: f.o.b. Glasgow, 35s. to 37s. per ton; in bulk for home trade, 35s.

PYRIDINE.—90/140%, 12s. 6d. to 14s. per gal.; 90/160%, 10s. 6d. to 11s. 6d. per gal.; 90/180%, 3s. to 4s. per gal. f.o.b. GLASGOW: 90% 140, 10s. to 12s. per gal.; 90% 160, 9s. to 10s.; 90% 180, 2s. 6d. to 3s. MANCHESTER: 11s. to 14s. per gallon.

TOLUOL.—90%, 2s. to 2s. 1d. per gal.; pure 2s. 4d. GLASGOW: 90% 120, 1s. 10d. to 2s. 1d. per gal. MANCHESTER: Pure, 2s. 4d. per gallon, naked.

XYLOL.—Commercial, 2s. 3d. per gal.; pure, 2s. 5d. GLASGOW: Commercial, 2s. to 2s. 1d. per gal.

Wood Distillation Products

CALCIUM ACETATE.—Brown, £6 15s. to £9 5s. per ton; grey, £8 to £8 5s. MANCHESTER: Brown, £8; grey, £9 10s.

METHYL ACETONE.—40.50%, £32 to £35 per ton.

WOOD CREOSOTE.—Unrefined, 6d. to 8d. per gal., according to boiling range.

WOOD NAPHTHA, MISCIBLE.—2s. 8d. to 3s. per gal.; solvent, 3s. to 3s. 5d. per gal.

WOOD TAR.—£3 to £8 per ton, according to quality.

Intermediates and Dyes

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZIDINE, HCl.—2s. 7½d. per lb., 100% as base, in casks.

BENZOIC ACID, 1914 B.P. (ex toluol).—1s. 11½d. per lb. d/d buyer's works.

m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.

o-CRESOL 30/31° C.—6½d. to 7½d. per lb. in 1-ton lots.

p-CRESOL, 34-5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.

DICHLORANILINE.—2s. 1½d. to 2s. 5½d. per lb.

DIMETHYLANILINE.—Spot, 1s. 7½d. per lb., package extra.

DINITROBENZENE.—7½d. per lb.

DINITROCHLORBENZENE, SOLID.—£79 5s. per ton.

DINITROTOLUENE.—48/50° C., 8½d. per lb.; 66/68° C., 11d.

DIPHENYLAMINE.—Spot, 2s. 2d. per lb., d/d buyer's works.

GAMMA ACID, Spot, 4s. 4½d. per lb. 100% d/d buyer's works.

H ACID.—Spot, 2s. 7d. per lb.; 100% d/d buyer's works.

NAPHTHIONIC ACID.—1s. 10d. per lb.

β-NAPHTHOL.—£97 per ton; flake, £94 8s. per ton.

α-NAPHTHYLAMINE.—Lumps, 1s. 1d. per lb.

β-NAPHTHYLAMINE.—Spot, 3s. per lb.; d/d buyer's works.

NEVILLE AND WINTHER'S ACID.—Spot, 3s. 3½d. per lb. 100%.

o-NITRANILINE.—4s. 3½d. per lb.

m-NITRANILINE.—Spot, 2s. 10d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 10d. to 1s. 11d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra. 1-ton lots d/d buyer's works.

NITRONAPHTHALENE.—9½d. per lb.; P.G., 1s. 0½d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 11d. per lb.; 100% d/d buyer's works.

SULPHANILIC ACID.—Spot, 8½d. per lb. 100%, d/d buyer's works.

o-TOLUIDINE.—10½d. per lb., in 8/10 cwt. drums, drums extra.

p-TOLUIDINE.—1s. 10½d. per lb., in casks.

m-XYLIDINE ACETATE.—4s. 3d. per lb., 100%.

COMPANY MEETING

The British Drug Houses, Limited

Continued Policy of Development — Difficulties of Export Trade—Mr. Charles Hill's Survey

The annual general meeting of the shareholders of The British Drug Houses, Limited, was held on Tuesday, April 18, at 21, Tothill Street, Westminister, S.W.

Mr. Charles Alexander Hill, B.Sc., F.I.C. (chairman and managing director), presided.

The Chairman, in his speech, said:—

As you will have seen from the report, the board sustained a sad loss at the close of last year through the untimely death of Mr. K. G. Shaw, who was one of our export directors.

It will be seen from the printed accounts that the fall in trading profit as compared with 1937 is £5,455. Although there is a saving in amortisation, due to the successful negotiation of our various leases, depreciation is higher, and on balance these items have risen by £785. The net profit is down by the sum of £8,278.

Turning to the balance-sheet, it will be seen that the assets now total more than £1,000,000, and that the balance sheet shows a strong position. The addition to the fixed assets of some £13,700, the major portion of which is made up of improvements in and additions to plant and machinery, reflects the company's continued policy of development.

The amount invested in our two subsidiary companies in Australia and Canada has increased by some £7,800. The turnovers and profits of both these companies again show increases, and the total amount invested, as shown in the balance sheet, is represented very largely by floating assets such as stock and debtors in those countries.

Taking near figures, the current assets at a total of £572,000 show an increase of £27,000, of which £22,000 represents an increase in stock-in-trade.

The increase in stock will not require much explanation: it is no more than common prudence in view of the general situation and the needs of our business.

Export Trading

Difficulties in carrying on export business, far from becoming less onerous, have actually become intensified, and we are increasingly handicapped by restrictive measures. These include compulsory licences for exchange, and licences for imports governed by constantly changing quota allowances; while, in some countries, we have to face subsidised competition from foreign manufacturers who are assisted by Government-controlled exchanges. Import licences constitute an especial difficulty. This practice is increasing, and has now been adopted even by one of our Dominions.

The barter system in certain countries also operates to our disadvantage, and we are prevented from obtaining our fair share of trade owing to the fact that other nations in direct competition with us insist on 100 per cent. exchange of goods. Added to these difficulties is the competition through over-production, with the consequent lowering of world prices, resulting from the desire of every nation, large or small, to be self-supporting in the fine chemical industry.

To sum up: our export trading continues to be hampered by one restriction after another. These have increased to such an extent and are of such a nature as to make it impossible for manufacturers themselves to cope with the difficulties. They have now reached the stage when only Government intervention can furnish effective assistance.

Our policy of maintaining close personal contact with buyers in export markets has been continued, and in the latter part of 1938 our export director, Mr. F. C. O. Shaw, visited India, Malaya and Siam.

Scientific Developments

I should like now to say a word about our activities on the scientific side.

Knowledge in the field of curative and preventive medicine continues to advance rapidly, and particularly has this been the case during the past few years. It is a responsibility of companies such as ours to employ their technical resources in rendering new scientific products available as they become known. This naturally involves expenditure on research and development which is not inconsiderable, but which I believe is fully justified by results.

Resulting from this policy, during the past year important additions have been made to our range of medical products, particularly in the field of sex hormones and vitamins. Pioneer work in developing methods for the large-scale production of pure vitamins has been proceeding for more than 10 years, and has placed the company in a unique position for satisfying the need for extra-dietary vitamins, whether they be administered in concentrated form, as in radiostoleum and multivite, or incorporated in food products.

For years it has been well recognised that a minimum intake of vitamins in the diet is essential for healthy growth. It is now becoming recognised that a vitamin intake much in excess of that minimum is desirable in order to attain and maintain the highest level of health and vitality.

(Continued at foot of next column.)

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

ENDOGRINES-SPICER, LTD., London, W., manufacturers of medical preparations. (M., 22/4/39.) March 28, debenture, to Barclays Bank, Ltd., securing all moneys due or to become due to the Bank; general charge. *£5,225. June 13, 1938.

BRITISH IRON AND STEEL CORPORATION, LTD., London, S.W. (M., 22/4/39.) Sept. 5, 1938, £2,000,000 (not ex.) mortgage to Barclays Bank, Ltd., and District Bank, Ltd.; charged on the benefit and advantage (subject to a deed dated Nov. 22, 1937), of certain agreements. *£1,928,747. June 3, 1938.

COATES BROTHERS AND CO., LTD., London, W.C., printing ink manufacturers. (M., 22/4/39.) March 28, charge, to Norwich Union Life Insurance Society, securing £31,250, etc.; charged on 1-7 Easton Street, St. James, Clerkenwell. *Nil. Jan. 13, 1939.

L.T.C. DISTILLATES, LTD., London, S.W. (M., 22/4/39.) Apr. 5, £50,000 debenture, to Low Temperature Carbonisation, Ltd.; general charge. *£150,000. July 5, 1938.

RICHARD THOMAS AND CO., LTD., London, W.C., steel tinplate manufacturers. (M., 22/4/39.) Apr. 3, £550,000 debenture stock, part of an amount already registered. *£8,620,410. Aug. 11, 1938.

WILSTRUD, LTD., London, W.C., manufacturers of polishes. (M., 22/4/39.) April 5, £600 debenture, to C. E. G. Hope, London; general charge.

Satisfactions

YORKSHIRE INDIGO SCARLET AND COLOUR DYERS, LTD., Leeds. (M.S., 22/4/39.) Satisfaction April 11, £2,535, part of amount outstanding July 1, 1908.

County Court Judgments

FYLDE INDUSTRIES, LTD., Brook Hill, Kirkham. (C.C., 22/4/39.) Dry soap makers. £35 1s. 5d. March 6; and £17 11s. 4d. March 7.

Company Winding-up Voluntarily

BRITISH ALIZARINE CO., LTD. (C.W.U.V., 22/4/39.) March 31 (members). H. G. Hurst, Hexagon House, Blackley, Manchester, liquidator.

Declaration of Solvency Filed

ZINC DEVELOPMENT ASSOCIATION, LTD. (D.S.F., 22/4/39.) London, S.W. March 30.

Receiverships

ACME SOAP CO., LTD., Manchester. (R., 22/4/39.) W. Archer, 78 King Street, Manchester, has been appointed receiver and manager. April 4.

KOPPERS COKE OVEN CO., LTD., Sheffield. (R., 22/4/39.) J. T. Rankin, Church Street, Sheffield, has been appointed receiver and manager. April 4.

BRITISH ACETATE SILK CORPORATION, LTD. (R., 22/4/39.) Stowmarket. E. Maloney, has ceased to act as receiver and manager. March 31.

(Continued from preceding column.)

Once more do I welcome this opportunity to pay tribute to the services rendered by our staff during the past year; and this applies to the whole of our employees both at home and abroad, who work wholeheartedly and diligently in the company's interest.

Some of you may have noticed in the Press recently a reference to the encouragement given by your company to its employees who belong to the Territorial Army—namely, the grant of special leave with full pay for the period of their annual camp, in addition to their usual annual holiday with full pay.

Before I conclude you will probably wish me to say a word about future prospects. It is encouraging to be able to report that for the first three months of 1939 our turnover both at home and abroad has shown highly satisfactory increases. I am bound to add, however, that such improvement should be viewed with reserve, since the chances of permanent trade prosperity are inevitably bound up with the question of international affairs.

The report and accounts were unanimously adopted, and the proceedings concluded with a hearty vote of thanks to the Chairman and Directors.